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18 screamers tested

Handhelds

Annual shootout

Reviews

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It's not as simple as it looks.

processing engine that enhances colour reproduction, improves AF accuracy and increases processing speeds. Add to this the high-res sensor and a fast f2.8 Canon lens, and you can be sure of capturing images of the highest quality. Once you've got the shots you like, Canon's intuitive software lets you download, edit and print the images at the touch of a button. Or, just to make things even simpler, the S45 can even print directly to selected Canon printers without needing a computer. For more information please call 1800 021 167 or visit www.canon.com.au/digitalimage

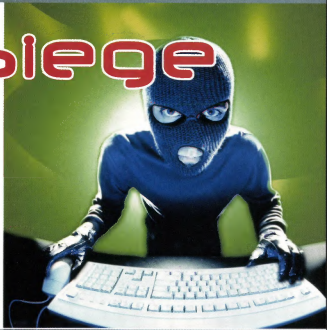
Canon

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Under Siege

APC's annual Security Report tracks disturbing trends and reveals the deceptive tactics used by the latest crop of viruses and spyware. We also explore the latest online threat: identity theft.

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Surviving the silicon race

AMD is finally gaining some serious CPU marketshare from Intel. But the conventional PC arena alone isn't big enough to ensure AMD's survival, forcing the chipmaker to move into high-tech territories that are as potentially dangerous as they are profitable.

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IT budget squeeze

The era of the IT spending frenzy is over. David Braue investigates the frugal new world of the business IT budget and how, despite the apparent gloom, it's not all bad news for the IT sector.

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Need to Know

Tech in 2003: Canberra speaks ▶
APC canvasses the views of the Government and the Opposition on the local IT industry's challenges in 2003.

Web usage numbers drying up
Despite growth overseas, Australia's Internet usage is on the decline. Are we the first in a trend or merely an anomaly?

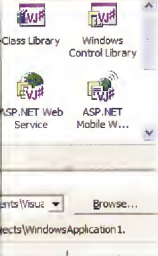
Opinions

APC readers on Mandrake, Microsoft and malingering firewalls.

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On Test



- **Visual Studio .NET 2003** APC's special preview of the new version of Microsoft's development suite shows it to be more of a minor update than a sweeping overhaul.
- **Reviews** We test Seagate's new Serial ATA drive, trial AOpen's Pentium 4 notebook, take Lindows 3.0 for a run, look at the CanoScan 8000F scanner, plus plenty more (full list, see right).
- **First Byte** A quick-heads up on hot new gear: Sony's Cyber-Shot DSCF77 digital camera, Adaptec's new USB 2.0 hubs, Nokia's gaming mobile phone and Hasbro's interactive droid.
- **GeForce FX** It's faster than a speeding bullet and renders tall buildings in a single bound, but is that all the GeForce FX offers? Tech Briefing lifts the lid on nVidia's speed king.



Reviews

- Notebooks: Sony VAIO PCG-FXA10 and AOpen OpenBook 1846
- Seagate Serial ATA hard drive
- Lindows OS 3.0
- Ximian Evolution 1.2 mail client
- Canon CanoScan 8000F flatbed scanner
- BLUETAKE Bluetooth access point
- Mobile Messenger Plus 1.4
- Canon PowerShot G3 digital camera
- Microsoft FrontPage 11 beta
- Tripper USB 2.0 portable storage device
- Microsoft wireless keyboard and mouse
- Dana Palm OS notebook

58 Video card shootout



APC tests 18 graphics cards to find the pick of the pixel litter.

Also in February's APC Labs Challenge

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Notebook Mice

We road test five mobile mice.



70

Handhelds All the latest contenders in this diverging market.



Workshop

- **Windows** Revamp, renew or replace? Make Windows Explorer work the way you want.
- **Linux** How to use Linux at work while still maintaining compatibility with a Windows network.
- **Hardware** Boost your hard drive performance with our DIY guide to setting up RAID in Windows 2000/XP.
- **Web** Add some spice to your Web site with the elegant, efficient and free Outline applet.
- **Networking** Hands-on tips for making wireless networking work in Windows XP.
- **Photoshop** Make your site stand out from the crowd with Favicons — customised bookmark icons.
- **Mac** Access Windows applications via your Mac with Microsoft's free Remote Desktop Connection Client.

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Techlife

Games:
What's hot in 2003
Long awaited sequels, next-generation graphics and new gameplay styles all vie for attention in APC's look at a handful of games that will set the agenda in 2003.

Game reviews:

Splinter Cell

The Xbox hit comes to PC, and it has been worth the wait. Also reviewed: Rallisport Challenge, WRC II Extreme, and more.



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When you see this CD icon in APC, it means there's bonus software on the cover CD set.

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Explore your options

Use the programs on this month's CD to enhance or replace the Windows Explorer file manager, as well as create more productive, useful, secure and cooler looking desktops.

Test your graphics card

Find out how well your 3D graphics card performs with the benchmarking tools on this month's CD. Run a barrage of complex and real world tests to see how your graphics card's performance rates.

CD1 INDEX

FEATURES

SECUREDESK! LV — FULL VERSION SecurDesk! LV plus special offer

SURFSECRET 3.0R — FULL VERSION SurfSecret 3.0R plus special offer

SECURITY Ad-aware 5.83 • AdSubtract PRO 2.55 • Anonymity 4 Proxy 2.52 • Anonymizer Privacy Toolbar 2.0 • Anti-keylogger 2.3 • 8CWIpe 3.0 • BestCrypt 7.08 • Cache & Cookie Washer 4.5 • Cookie Pal 1.7 • Hide Folders 2.3.5 and XP 1.2 • McAfee Internet Security 5.0 • McAfee Firewall 4 • McAfee VirusScan 7 • RefUpdate 2.01 • SecurDesk! • SnoopFree Privacy Shield 1.0 • SplashID Password Safe 2.5 • SurfSecret Privacy Protector 5.2 • Sygate Personal Firewall 5.0 • Who's Watching Me 1.3 • WinSettings 5.1 • ZoneAlarm 3.1.395

WORKSHOP

LINUX Alvaro's Messenger 0.71 • Netscape 7.01 • OpenOffice.org 1.0.1 • Samba for Mandrake 9.0 • Samba for Red Hat 8.0 • Samba for Suse Linux 8.1 • smbconftool 1.0 beta • GIMP 1.2.3 • Wine 120802 • Wine 120802 with GL Support • Ximian Red Carpet 1.4.0 For Mandrake 9.0 • Ximian Red

Carpet 1.4.0 For Red Hat 8.0 • XMMX 1.2.7

PHOTOSHOP favicon.ico • FavIcon.psd • IconBuilder Pro 3.5.1 • IconBuilder XP 1.1 • IconEdit32 1.0 • IconForge32 6.23 • Microangelo 5.56

WEB Java Workshop sample files

WINDOWS Bojanov Tbrowser 1.1 • DesktopX 1.2 • Directory Opus 6 • PowerDesk Pro 5.0 • SendTo FTP 2.5 • SendTo Magic 2.10 • Turbo Browser 2001 8.0.120318

TOOLKIT

LINUX Adobe Acrobat Reader 5.0.6 • Firestarter 0.9.0 • gFTP 2.0.14 • GIMP 1.2.3 • RAR for Linux 3.00 • RealPlayer 8.0 • SADP 3.1.5d • XMMX 1.2.7 • Xmovie 1.9.7

MAC OS Adobe Acrobat Reader 5.1 • A4 Paper Sizes 10.2 • Bibliographer 1.1.2 • Fire 0.32.a • InfoEdit 2.0 • iSwipe 1.2b11 • MT-NewsWatcher 3.2 • TinkerTool 2.32

WINDOWS Ad-aware 5.83 • Adobe Acrobat Reader 5.1 • DirectX 8.1b runtime • DivX Video Bundle 5.0.2 • ICQ 2003a Beta Build #3777 • IE Restore 6.5 • Microsoft Windows Media Player 7.1 • RealOne Free Player 2.0 • RefUpdate 2.01 • Winamp 3.0 Full • WinZip 8.1 SR1 • WS_FTP LE 5.08 • ZoneAlarm 3.1.395

IconForge 4.92: full version

Follow the Photoshop Workshop article in this month's APC and use IconForge to make a unique "Favicon" for your Web site. You can also create icons and cursors for your desktop and programs.

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Linux in a Windows world

Gone are the days when you had to run a commercial OS (and applications) to be productive. Increasing numbers of people are choosing Linux as their workplace OS. But how can you get by in a Microsoft-centric office? We've got the essential tools (OpenOffice, Samba and Ximian's Red Carpet) to help you kick the Windows habit and get connected with the rest of the team.



Cool gaming action!

PC shooter buffs have a treat in store with our playable demo of Medal Of Honor Allied Assault: Spearhead (for single player and multiplayer modes), while strategy fans will dive into Warcraft III and not surface for weeks!



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BROWSERS

- Microsoft Internet Explorer 5.1.6 for Mac OS
- Microsoft Internet Explorer 5.2.2 for Mac OS X • Microsoft Internet Explorer 6.0 SP1 • Mozilla 1.2.1 • Netscape 7.01

CD2 INDEX

FEATURES

- ICONFORGE 4.92 — FULL VERSION** IconForge 4.92 plus special offer
- CD BURNING** Apple Disc Burner 1.0.1 • AudioWriter 1.5.345 • BurnQuick 2.10b • CD Blaster 1.4 • CD Session Burner 1.0.1 • CDCheck 3.0.143 • CDRoller 4.11 • CDRWin 3.9b • FireBurner 2.1.6 for Linux • FireBurner 2.1.7 for Windows • IsoBuster 1.2 • iTunes 2.0.4 for Mac OS 9 • iTunes 3.0 for Mac OS X • NTI Dragon Burn 1.0.2 • RecordNow MAX 4.0

ON TEST

- REVIEWS** Ximian Red Carpet 1.4.0 For Mandrake 9.0
• Ximian Red Carpet 1.4.0 For Red Hat 8.0

- VIDEO CARDS** MadOnion 3DMark 2001 Second Edition
• Vulpine G1mark 1.1p

NEED TO LOAD

- MAC OS** Alepin 2.04 • Collaborate 1.1.0 • Comicastic 1.1.1 • Compositor 2.3 • Easy Card Creator 1.1 • Journalizer 1.0 • Little Secrets 1.4 • LogPile 1.1.1 • The Belt 1.03 • Whamb 1.0
- WINDOWS** Collectorz.com Music Collector 4.4 Build 14 • CursorXP 1.2 • DVD Region Killer 2.7.0.2 • DVD Region-Free 1.29 • NetCaptor 7.1.0 Beta 1 • Pop-Up Menu Creator • Photo2VCD Standard 2.52 • Primedia WebTunnel 3.12d • The Bat 1.62

REQUESTS

- CuteFTP Pro 3.0 • Windows Media Bonus Pack for Windows XP

TECHLIFE

- PC GAMES** Medal of Honor Allied Assault: Spearhead
• Warcraft III

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ISSUE 290 FEBRUARY 2003



Working at APC is an enjoyable gig. Frantic, yes, but always enjoyable. We get to go hands-on with the very latest gear and dive into the newest and yet-to-released technology. We get to write stories about things we're very interested in. We even get paid for it.

While we have a respected inhouse team of award-winning journo's, APC also relies on a pool of contributors to write across the magazine, from product reviews to Workshop articles.

Now we want to broaden that pool. One of our goals for 2003 is to find and develop Australia's next generation of technology writers. That's where you come in. You don't need to be a Shakespeare, but basic knowledge of grammar and an ability to write clearly and concisely are the keys.

And of course it's vital that you have an excellent understanding of technology, especially "deep expertise" in specialised areas. However, the most important attributes you'll bring will be your enthusiasm and ideas — ideas about the sort of articles you'd like to write for APC, because they'll be the sort of articles that you'd want to read in the magazine.

As if that's not enough, you get paid for your work and your words. You won't be able to ditch your day job, but you'll earn more than pocket money.

Freelance writing is fun. I should know; that's how I got started in this whole game almost 25 years ago, by answering a call for contributors just like this one. Now it's your turn. If you'd like to write for APC, drop me a line at dflynn@apcmag.com.

It could be a great start to the new year.

David Flynn

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need to know

News, views and analysis from the IT world

Tech in 2003: Canberra speaks

APC spoke to the Government and Opposition parties to bring you this easy guide to the big IT issues looming in 2003.

What once was a local industry offering competitive conditions has entered the doldrums. Removing priority entry for skilled migrants and a growing trend to outsource labour from cheaper countries highlighted the plight of the IT employment sector in Australia in 2002. The once highly mobile industry has workers clinging to their jobs and seeking union membership in an attempt to retain job security.

Shadow IT Minister Senator Kate Lundy regarded the issue of industry employment as a critical one: "Its root cause has been through a shrinking local ICT industry," she said. "Simply cutting immigration will not address ICT unemployment in the long term. As private sector training declines, unemployed ICT professionals must be supported in their efforts to become employable, through training and work experience programs."

The message for workers worrying about job prospects is to pay attention to the economy. "Industry development" will be a key buzz word in 2003, as Communications Minister Senator Richard Alston explained: "A strong economy benefits all industries—including the IT industry, which has shown continuing strong growth since 1996. A number of macro-economic measures with particular significance for the technology sector have also been put in place."

However, Alston's fiscal platitudes might not comfort the 220 staff who lost their jobs when financial giant AMP halved its internal IT headcount in late 2002. Job cuts are sure to be a lingering sore during 2003, while Alston's plate will also be filled dealing with complaints over the immigration of skilled foreign IT workers.

IT'S THE ECONOMY, STUPID

The second hottest debate in IT circles is over Australia's high-tech exports. The Australian Computer Society points to a \$1.7 billion decline in ICT exports over the last financial year, though the Government down-plays the figure. Both parties regard ongoing innovation and

cultivation of the local business as a high priority to getting the industry back on its feet.

Senator Lundy was less than glowing in her reaction: "The Coalition has prevented local SMEs from priming Government contracts. The Coalition has tried to cover up multinational corporations that renege on their commitments to SMEs," she said. "A challenge for this Government is to focus on developing local ICT businesses into an export industry, rather than making the local industry dependent on foreign-based multinationals."

For its part the Government is trying make sure Australian SMEs have better chances at winning government contracts. "The SME Facilitation package that was part of this restructure is developing methods to ensure ICT SMEs are better informed of, and have greater access to, government ICT contracts," Senator Alston said.

Looking forward, the ACS has predicted the ICT deficit will stand at close to \$27 billion by 2010, almost double its 2002 figure of \$14.4 billion. The Government disagrees. Stay tuned, this bunfight is bound to get better.

TELSTRA, TELSTRA, TELSTRA

If not jobs or the economy, then nothing raises the ire of Australian IT consumers than the thorny issue of broadband. Despite slight drops in some of Telstra's pricing plans, availability, quality, conditions of service and value for money are still key areas of dissatisfaction. Just about the only people not complaining about broadband are those lucky few living in new estates with privately funded "cable to the home".

Both parties say the Net issue will be high on the agenda in 2003. Senator Lundy had a few brickbats for Australia's largest telco. "Telstra has not invested in its infrastructure," she said. "Its copper network will never provide affordable, universal broadband across Australia. Worse still, Telstra is using its monopoly position to squeeze out potential competitors."



The Telstra sale is now off the agenda, though Lundy argues not before time: "The Government's pre-occupation with selling Telstra has stunted ICT policy that fails to inspire Internet users."

It now looks inevitable that copper ADSL connections will outstrip cable as the most popular broadband technology. The short-term cost savings made by Telstra in deploying ADSL are being eroded by the cost involved in remedying problems with non-compatible telephone lines. The telco has committed to spending \$10 million to make DSL available to 100 additional exchanges by June 2003.

Are our politicians doing enough for IT? Tell us what you think at apc@apcmag.com.

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APC readers have their say.



Can't hack it? Then get a day job

Why has Australia's most well known "hacker" collective suddenly called it quits? FBI warnings? Police pressure?

Nope, they've just gone back to their day jobs.

It seems the pressure of the outside world has taken its toll on the underground crew of 2600. No longer the fresh-faced youngsters they once were, many have now finished high school, grown up, become employed and in some cases married.

With less time under their belts, the group's frontman Grant Bayley announced recently he was putting the group's Web site (www.2600.org.au) "to sleep".

"We're all older," he told *APC*. "We're all employed in jobs that are demanding more and more of us... And quite honestly, we don't have the time for it."

For at least four years the varied bunch of IT workers, high school students, gamers and technology enthusiasts gathered online and in person to swap stories about electronics, hacking and privacy issues. Meetings were held on the first Friday of every month in cities around Australia, usually over a beer or two. Often the group arranged to meet in public areas, sometimes beside nondescript telephone booths.

The group took its name from American underground collective 2600, so-named after the 2600 Hz signal used by the forerunners of hackers in the late 1970s to access long-distance telephone systems for free calls. In Australia the 2600 mailing list had roughly 700 readers, and the group reportedly had occasional contact with NSW police wanting help investigating computer crimes. 2600 also made submissions to a Senate hearing relating to the Cybercrime Act 2001 and spoke out against Net censorship in 1999.

Nowadays, you're more likely to find the crew (Zero Sum, Sanbar, zem, black-hand, arkenstone, PhoenixX, dec, Skeve Stevens, Woofie, Headshot, Technion, xfesty, happy_dude and others) buried behind an office desk, maybe even in a suit. Bayley himself works as a data security consultant, and argues some employers might be "fussy" about staff being in the group.

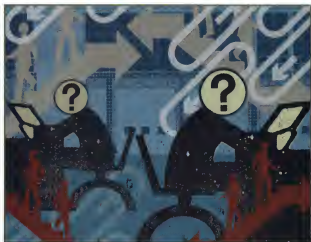
Icon Recruitment agent Jill Noble agrees that some "traditional" companies might worry about staff taking part in hacker-type activities. "It's the trust factor. They would think 'why are they going along to learn this? Are they going to use this against us?'" she said.

"Those that are skeptics perhaps would

feel that [they] don't want to retrain this guy in case he goes and hacks into my system. Typically that's probably one of the reasons IT people are escorted off site immediately. It's because of the power that IT people have," Noble said.

But for all the concern, it seems the cloak and dagger mystery of technology's underground is wearing off for some. "[Some people] are realising that as they grow older and take on greater financial responsibilities with families, the idealism they once pursued isn't always achievable. Especially in a security environment where dissent and mischievous behaviour could easily be misconstrued as something much more sinister; even terrorist [sic] in nature," Bayley said.

Increasingly stomach churning punishments and legal threats have been introduced for hackers since September 11, 2001. America's new "Homeland Security" bill reserves life imprisonment for any hack that knowingly attempts to cause death — enough to make some wannabe Internet pranksters



think twice before touching a modem.

Hacking has certainly lost some of the appeal it may have attained in the 1980s with movies like *War Games*. Today, even hacker-celebrity Kevin Mitnick can be found in a suit.

While the 2600 site lies dormant and the group winds down, the email discussion list will continue under another name. Members will still be involved in side projects, like Bayley's Internet site *Wiretapped*, a popular download site for security software. Other hacker-type groups still left in Australia include 7dfb, phreak-au, halcon and aloc.

Movies on demand

Movies on demand are finally here, sort of. *APC* interrogated the local subsidiaries of US movie studios to get the good oil on when Australians can expect to enjoy this momentous announcement. Apparently never. But we can dream the dream.

HOW MOVIELINK WORKS

- 1 Relocate to the United States.
- 2 Go to the Movielink Web site (www.movielink.com) and hand over your virtual cash. Register a username and password.
- 3 Install the Movielink Manager, a proprietary piece of software that is your interface with Movielink.

- 4 Time to select a movie. Choose your format: Real Player or Windows Media. Different movies cost different amounts, but they are all priced between US\$3.99 to US\$4.99. Download the film on your high-speed Internet connection. Ponder the fact that if you were on a similar connection in Australia, a movie download of around 600MB would constitute 20% of the standard monthly broadband download limit.
- 5 Use Movielink Manager to play your movie. You have 24 hours to watch the movie once you hit play. You won't be able to copy the movie to another location because it doesn't actually show up anywhere except in the Movielink Manager.

Space-saving technology

Australia's property boom brings new meaning to "space-saving" PCs.

Looking for an excuse to buy an LCD screen? Try this equation: a good quality 17in CRT monitor takes up around half a square metre of real estate and costs around \$250, while a decent 17in LCD monitor uses about a quarter of that and costs \$1,200.

But while hardware prices stay the same in each state capital, property doesn't. So where does it pay to trade up technology for space?

LCD vs CRT cost comparison

CBD Office Space	Value per square metre	CRT	LCD
Sydney	\$4,500	\$2,500	\$1,762.50
Canberra	\$2,500	\$1,500	\$1,512.50
Brisbane	\$2,500	\$1,500	\$1,512.50
Melbourne	\$2,300	\$1,400	\$1,487.50
Perth	\$2,200	\$1,350	\$1,475
Adelaide	\$1,700	\$1,100	\$1,412.50

Source for real estate prices: CPM Research 2002

In Sydney, the value of CBD office space is \$4,500 per square metre, according to CPM Research. A CRT costs \$250 and chews up \$2,250 in real estate, while an LCD costs \$1,200 but only uses \$562.50 of space. So, your CRT ends up costing \$2,500 compared to \$1,762.5 for an LCD. Even when you subtract the upfront cost of your old CRT, it pays to invest in a flat screen.

In Adelaide, a CRT is a much more attractive at \$1,100 compared to \$1,412.50 for an LCD. Perth also slightly favours CRTs, while the costs are about the same in Canberra, Melbourne and Brisbane. Bosses can use LCDs to make up the minimum amount of space they're required to allocate to each worker under health and safety laws.

A similar equation can be applied to residential property in the wake of last year's



skyrocketing home prices. In mid-2002, figures from Market Facts showed Sydney had a median house price of \$388,000, Melbourne \$327,500, Brisbane \$230,000, Canberra \$227,600, Perth \$185,700 and Adelaide \$170,000.

The 2002 cost of living survey by Mercer Consulting ranked Sydney as the 95th most expensive city in the world, followed by Melbourne at 127, Brisbane 134, Perth 137 and Adelaide 138. For some, it may be more worthwhile to make the most of their (hopefully appreciating) real estate assets as opposed to (inevitably depreciating) technology investment.

Life after antitrust

What has years of courtroom crusading really achieved?

The US Department of Justice may have extracted key concessions from Microsoft in a final settlement of its long-running antitrust battle, but for consumers it's about five years out of date.

The struggle to bring more competition to the PC platform stretches back to the early '90s and the emerging market for browsers and Net technology. Although the court eventually found Microsoft had engaged in anti-competitive behaviour to maintain its domination over the desktop, by then, the software under question had become just another part of the OS.

As the case dragged on, Microsoft was quickly moving ahead. They began transforming Windows from a pure desktop OS into a platform for servers, handhelds, phones, consoles, set-top boxes, workstations and into the emerging digital rights management (DRM) arena. The settlement doesn't apply to these new platforms.

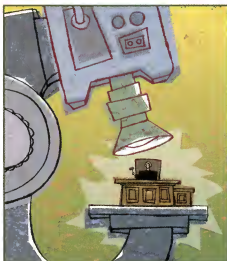
So what's left for consumers? Rather than punishing Microsoft, the settlement seeks to change the company's behaviour by enforcing three key concessions: 1) Equal access for all

middleware on the Windows desktop. 2) Reveal some Windows APIs to third party developers. 3) Don't attempt to penalise system builders for including non-Microsoft products.

With desktop middleware applications now mature, the only significant threat to Microsoft's dominance lies in the third provision. This could make it easier for PC makers to offer low-cost Linux machines (or even dual boot systems) alongside Windows PCs.

An internal Microsoft committee has been set up to ensure the company complies with the terms. The coming months will reveal whether the software colossus has changed the way it treats customers and competitors.

After sealing the "tough but fair" settlement, Microsoft chief executive Steve Ballmer sent out a mass email promising to be more customer-friendly. "We have affirmed a set of basic values that are now part of every employee's performance review," he stated. "It starts with integrity and honesty. Frankly, part of the problem was that, even five years ago, we still tended to think of ourselves as the small



startup company that we were not so long ago. Today we recognise that our decisions have an impact on many other technology companies."

The settlement is a significant victory for Microsoft and could help in continuing legal action by competitors including Sun and Netscape. It could also assist Microsoft in the ongoing antitrust investigation by The European Union's Competition Commission. On the other hand, at the time of writing, the settlement could be open to appeal.

Linux: having the last word on Linux

Linux Torvalds explains why Linux will beat Windows on the desktop.

The battle between Linux and Windows to win the hearts and minds of desktop users is heating up, with a whole new level of insults flying between the two camps. Microsoft chief executive Steve Ballmer raised the stakes during his recent visit to Sydney (APC December 2002, page 16) when he accused Linux of cloning Windows and the open source movement of lacking innovation. APC forwarded his comments to Linux Torvalds and asked him whether Linux really has what it takes to make it on the desktop.

Linux: I think he's certainly wrong on the innovation point, but I really think that's completely beside the point and a red herring in the first place. A large part of Linux innovation has been in the development model, which is also clearly the thing that is causing Microsoft problems.

But there is a much more fundamental issue that he is completely ignoring: neither operating systems nor office applications are in any way anything "new and exciting" or big an innovation on a technical level any more.

There are a lot of technical details to be excited about in on OS (after all, it's what I've been doing for the last 10+ years, and I did it just because it is a lot of fun). But at the same time clearly most of the OS research was actually done in the 1960s and we've lagged since gotten to the point where users should just take it for granted. Office suites did the same during the '90s. In short, OSes are commodities, as are Office applications. That means two things:

- 1) You really want the innovation built on "top" of the OS, and you want the innovators to do great new applications and nice user interfaces to go with them. The OS should be a stable base to build on, with all the plumbing installed correctly. Stability and security are the most important parts of the OS, to let innovation happen on top of it. This is something that Microsoft seems to have constantly ignored.*

- 2) From an economics standpoint, "commodity" means something else. It means something so basic that everybody has it, and by implication in a free market it also means that people compete on price and convenience and*

that the profit margins are in the single-digit percentage range. Ask any economist.

Now, the reason MS doesn't want people to realise that OSes and Office apps are commodities is that they get 90% profit margins on the thing!

So can Linux be as good as Windows on the desktop? Can Windows be as good as Linux on the network?

I'm obviously biased, so don't ask me... Instead of answering directly, I'll just point out that what really matters is how efficient the development process is (i.e., "which gets better faster?") and what the economics of the product is (i.e.,

"which one has an advantage in the market space?"). My personal claim is that both of these clearly favour Linux. Which is not to say that it will be overnight. There's a lot of inertia in existing systems and programs, so these things move fairly slowly. But they're clearly moving.

Will the OS that establishes itself on the desktop and network win out? What's the future for Linux?



▶ **Smiles ahead:** Linux is confident his OS is the best.

The desktop is the more important of the two, simply because it's the one people see and interact with daily. I certainly see Linux on the desktop, that's always been my personal own usage. Yeah, I obviously use Linux on servers too, but like just about everybody else, I don't really think about it.

Penguin makeover set down for June

The latest version of the Linux kernel is set to go public by June, with significant advances expected to help establish Linux as a desktop OS.

Version 2.6 of the Linux kernel is expected to include a much-anticipated overhaul of the I/O subsystem or block device. If the improvements live up to expectations, PCs running Linux will be better able to recognise and manage drivers. This will help solve an entrenched barrier for installing Linux on the desktop by improving communication between the hardware and the OS.

Torvalds made the deadline prediction last October when a freeze was set on submitting new features for the release. A similar freeze on new code is set to come into effect early this year.

However, launch dates are notoriously unreliable for open source software simply

because the development process involves many different volunteer programmers based around the world. For the latest kernel, a more decentralised development system based on BitKeeper software was used (ironically, a proprietary program). Torvalds' efforts to introduce a more structured and reliable kernel development regime is designed to allow companies who release Linux products to better plan upgrade cycles.

Torvalds, who famously pioneered the open source OS and spearheaded programming on Linux 0.01, continues to oversee kernel development. He is employed by chip-maker Transmeta and is currently busy reviewing, accepting and discarding code already submitted for the 2.6 release. You can check out the latest kernel at www.kernel.org.

Exchange: Stephen Peach



The CEO of Australia's Record Industry Association (ARIA) says to reduce music CD piracy there will be copy-protected CDs. But will the punters stand for it?

Stephen Peach has worked in copyright law and for an Internet startup, which is a good thing, because the Internet and piracy are now hot on his agenda as CEO of ARIA. CD sales in the US are down, file sharing networks like KaZaA are a rife, and people like Peach must try to convince consumers that new anti-piracy technology that curbs the copy free-for-all is in their best interests. Copyright-protected CDs are now being identified in stores with a special label.

Have you decided to use CD copyright technology more widely in Australia?

The decision about rolling out copy control technology is one that is taken by all the record companies individually. Whether they roll it out and if so when, and on what CDs — these are all commercial decisions made by individual record companies. Also the technology they choose to use, out of about half a dozen available technologies, these are again commercial decisions. We certainly aren't out there pushing a particular technology or necessarily encouraging its introduction.

What about making an MP3 collection from your music CDs? Is that also illegal?

It is. The industry is criticised for introducing technology that would prevent that sort of thing. The trouble is we can't have it both ways. CD burning technology is being used to undertake infringements on a massive scale. Our understanding is that there are more blank CDs sold in Australia than regular CDs. Overseas experience would suggest that at least 50% of them are used to copy music. That's the extent of the challenge we're facing from home burning.

The music industry in the US is taking active steps to clamp down on peer-to-peer file sharing networks like KaZaA. Is the same thing going to happen in Australia?

We are working with [local] ISPs at the moment to work out some sort of protocol to deal with infringing activity generally; notice and takedown procedures — things like that. And looking at ways and means of how we involve the ISPs in our response to this sort of threat.

We don't see the ISPs as the enemy, but I think that they clearly are the gateways to these sorts

of sites and these sorts of services. So it would be good to think that we could work with them in trying to minimise access to these sorts of infringing services.

Who have you spoken to about this?

There are discussions in train with the Internet Industry Association (IIA). We'd prefer to take on industry approach, rather than have separate discussions with Ozemail, BigPond and so on.

What challenges are there to getting online music sales up and running?

The biggest challenge is we are competing in a pirate market. It's hard to compete with someone who is giving it away for free. We need broadband to make our online business models work. You may have heard of PressPlay and MusicNet in the US; if you don't have broadband it just doesn't work. The vast majority of domestic Internet users in Australia are still on 56K dial-up modems.

Can you see the music industry reshaping around the Internet?

The industry takes some positives from the Napsters and KoZaAs. They demonstrate that people are still vitally interested in music. And there's a lot of people that are happy to get their music via the Internet, and some who would absolutely prefer to get it that way. That to us represents a great market opportunity.

The one thing the industry has not been able to do is customise compilations for people. Well, this actually allows us to do it. There's no technological reason why every single recording ever made couldn't be available on a system like this. But that requires people to get behind this and to stop supporting the pirate networks.

We will have high quality recordings. If you go to MusicNet or PressPlay you will know you are going to get a high quality digital copy. If you use KoZaA you've got no idea, you might get 10,000 responses to a request. You don't know if it's come off vinyl, whether they chopped it off half way, whether it's the mix you wanted or any number of alternatives. It seems as though there's a range of spyware that goes with it as well. So I think there's real issues of security and quality of recordings that run with the pirate networks.

Is it legal...

To take the code from an open source program and use it in your own proprietary software?

No. Just because software is free, doesn't mean you can do whatever you like with it. Then again, who's going to bust you for a little low-key larceny on give-away code?

Most popular open source programs are covered by the GNU General Public License administered by the Free Software Foundation (FSF). The GPL is based purely on copyright law and is not like regular software licenses that seek to impose both contractual obligations and copyright restrictions.

But where copyright is designed to stop you reproducing and changing a work, the GPL explicitly grants you extra rights. It encourages you to run, copy, share, study, change and improve the software in any way. There's only one catch: if you then distribute the software (or code derived from the software), you must also openly distribute that work under the GPL. The source code must be accessible. Since this effectively makes the software "free", open source developers generally put a price on services and media rather than code.

If you break these rules, the copyright holder can take legal action against you (the FSF says it acts on every violation reported through www.gnu.org/licenses/gpl-violation.html).

But this imaginative use of copyright law hasn't been tested in an Australian court and only a handful of cases have been heard overseas. The FSF say they've had few problems enforcing it. Yet without a rock solid precedent, lawyers continue to argue over scenarios like a company which modifies a program and distributes it internally, proving the origin of a disputed code-set or whether small sections of compiled open source code or drivers count.

Is it fair to say the music industry is digging in its heels in regards to online music sales?

I understand why people would say that. The industry hasn't been selling the positive messages. PressPlay and MusicNet didn't get born overnight. You've got third party services like Rhapsody and Listen.com in the US. These things take a while. The other thing that's holding the industry back is we have to get clearances from the artists, we have to make sure people get paid.

Snapshot: tech trends at a glance

SUPER-CEDED

IBM has announced plans to build a pair of new supercomputing titans. ASCI Purple's processing power will weigh in at a "mere" 100 teraflops, while Blue Gene/L is expected to tip the scales at over 360 teraflops, more than six times the speed of the current fastest supercomputer, the Cray X1.



YOU'VE GOT MAIL, AGAIN

The email market is set to hot up in 2003 again. Titanium, Microsoft's major overhaul of Exchange, is intended for a mid-year launch, while AOL will enter the market with AOL Communicator. Communicator is meant to be an Outlook-style integrated instant messenger and email client supporting digital encryption of messages.



TELSTRA IN THE BANK... FOR NOW

It's the people's telco a bit longer. Plans for a Telstra sell off by the government have been put on the backburner. The telco's plummeting share price and revised budgetary estimates by Treasurer Peter Costello have put paid to any short term notion of selling the carrier's remaining holdings.



EDS STARS IN BOLLYWOOD

EDS, battered by recent financial woes, is rebranding itself for a cost-saving move to Mumbai, India. The city will be home to a new customer call center expected to house up to 700 staff of EDS' 20,000+ global workforce. The transfer is expected to be finalised by late 2004.



XBOX LIVENS MARKET

Microsoft's Xbox Live broadband online gaming subscription service had an auspicious start in the US. On the first day of sales it managed to almost sell out of the initial 150,000 shipment. For their US\$50, buyers received headphones, a year's subscription to the service, and a pair of game demos.



TAKING OUT THE TRASH

Scientists in Hawaii have developed a process that converts food scraps into high-grade plastic. The tonnes of landfill generated by decaying food matter can be chemically converted into biodegradable plastic. Meanwhile, tonnes of PC parts discarded yearly continue to accumulate in landfill in most developed countries, including Australia.



BIG BLUE ON THE RISE

Despite the server market declining in recent months, IBM's Linux strategy seems to be standing it in good stead. Gartner reports that in the third quarter of 2002, the market fell 3% in value to US\$10.5 billion. IBM meantime consolidated its leading position with 4% growth.



GATES CHARITY KING

Microsoft's Bill Gates is not only the world's richest man, he's also the most philanthropic. In its list of the top 50 philanthropists in the US, *Business Week* reported Gates' charity donations at US\$25.6 billion, almost half his present wealth. That amount not only buys you number one spot in the US, but also in the world.



ACTIVE DENIAL TECHNOLOGY

Late last year, soldiers at Marine Base Quantico got a look at the future of non-lethal weaponry. Net guns (to stop propeller-driven craft) and shotgun beanbag rounds (crowd control) got some attention, but non-lethal lasers for immobilising vehicles and crowd-dispersing heat rays were also showcased.



Data Dump

Quote file

"If Telstra ends up being the only game in town, why would they continue to offer rock bottom prices?"

Communications Minister Richard Alston was concerned that the telco's practices may squeeze out competitors ... In November 2002.



Sega's half-yearly loss before becoming a software-only developer	Sega's half-yearly profit after shedding its hardware business
20.87 billion yen	1 billion yen
Telstra share price November 1999	November 2002
\$7.40	\$4.47
Global IT industry contraction in 2002	IT growth over the past two decades
2.5%	20%
HP/Compaq's Q4 2002 profit	Combined pre-merger Q4 profit 2001
US\$72 million	US\$238 million
Number of transistors on nVidia's RIVA TNT (1998)	Reported number of transistors on nVidia's new GeForce FX
seven million	123 million

10,000,000

The Korean Government recently announced it had passed the 10 million mark for broadband users. Meanwhile, at the current rate of growth, our target of one million Australian broadband users by 2005 looks to be somewhat optimistic.

INTRODUCING OUR NEWEST DIGITAL SUPERMODEL.



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*Requires third party external card reader.

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Surviving the silicon race



After years of trailing behind Intel, AMD is now gaining market share. But times are tough, and the underdog must move beyond the home desktop PC into uncharted waters if it is to survive. William Maher reports.

AMD is to processors what BetaMax cassettes (RIP) once were to an unappreciative movie-watching public. The technology is capable enough, and it has bagged more than 100 awards — last year *The New York Times*, *Microprocessor Report* and numerous tech sites awarded AMD top honours. From 1999 to 2001, AMD's market share in PC processors rose from 13% to 21%, while market giant Intel lost ground. But despite the accolades, AMD has again fallen on hard times.

PC sales are stuck in a rut and chipmakers can no longer rely solely on home PCs for precious revenue. Everyone's affected, but up till late last year AMD had been losing money for five consecutive quarters and had a reported US\$2.31 billion in debt. What's more, the bad weather is getting worse. Gleaming silicon wafers are becoming more expensive to build, while sale prices in shops keep being cut. A whopping 15% of AMD's workforce was

recently told to hang up their green and white uniforms. But that's not enough to stem the bleeding — AMD needs a new game plan, and it needs it fast.

Rather than retreat into its shell, AMD has spied greener pastures. Australian managing director John Robinson estimates there are about 1.6 million PCs shipped in Australia every year, and he wants a larger slice of the pie. After years of supplying cheap chips to the home, to overclockers, gamers and tech geeks, the value-priced chipmaker wants to see its chips on office desks, in servers and in the hundreds of notebooks warming laps in coffee shops; it's a brave new world of super-charged 64-bit processors, low power notebook chips and onboard wireless networking.

"We have to go into those markets," says Robinson. "It's a survival thing really. We can't rely just on the home market."

Notebooks are now the new hot ticket item

and are keeping cash registers ringing while desktop PCs hardly raise a jingle of coins. A little over a year ago, Robinson says AMD was barely a player in portables; now the company is estimated to have roughly 17% of the market and is hungry for more.

So this once second-tier supplier has been busy in the lab. Instead of more of the same budget desktop chips, the conveyor belt has been churning out an increasingly wider array of sophisticated add-ons and high-end toys: like processors tweaked to save battery power in notebooks; and Alchemy, a low power wireless networking chipset for portables.

HAMMERING ON

AMD is also following Intel into 64-bit computing with the Hammer processor. Hammer has been built on existing desktop x86 processors, some say making it ideally suited for the transition from the 32-bit world of

Windows. There will be two versions available in the first half of the year, Athlon 64 for the desktop, and Opteron for servers. Ten years ago, if you had told AMD executives their future success would lie with high-end workstation and server technology, they would have laughed. Now Internet discussion boards are filled with wild speculation about Hammer, and some analysts are suggesting the high-end tech is AMD's only way out of a dead end situation.

The question is, what to make of AMD now that it's spreading its wings? AMD is still playing the "more bang for your buck" line. They argue that PC owners have been duped into an obsession with clock speeds, and are paying too much for bleeding edge technology like 3GHz chips that most people don't need.

"It's not going to make your Internet work faster," argues Robinson. "It's not going to make your spreadsheets or your Word documents or anything else go noticeably faster. At the end of the day 3GHz hardly justifies going to the top

end and paying some premium of \$1,000."

Still, in Robinson's mind there's no doubt the technology is just as capable as Intel's, whether it be a budget-priced desktop chip, or a fire-breathing Hammer. Intel may still have the lead in raw megahertz (and is now pulling away), but ever since the Athlon raised eyebrows when

but there's been no joy in the bottom line.

Despite promising gains in notebooks and business, overall market share has dropped again. At the high-end, new technology like Hammer has been delayed, and then Dell got jittery, opting instead for Intel's Itanium.

"The AMD processor is that David and

"At the end of the day 3GHz hardly justifies going to the top end and paying some premium of \$1,000."

it pipped the Pentium 4 for speed three years ago, people have been paying much more attention to this plucky underdog.

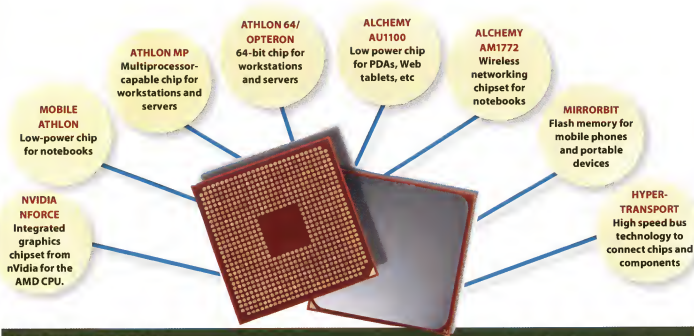
UPHILL BATTLE

But getting that message heard is an uphill battle. People have been taking AMD technology more seriously than ever before,

Goliath situation," argues Gartner analyst Ian Bertram. "No one should be scared about using AMD over Intel, it does give you that same performance. But most people take that cautious attitude."

"People recognise the Intel brand, they've been weaned on it for the past 10 years or more. It doesn't matter how good the technology is,

AMD spreads its wings



64-bit processors are just one of several new chip technologies for AMD as it diversifies to find revenue beyond the desktop home PC. Other new markets include mobile phones, notebook computers

and handhelds — areas Intel began targeting several years ago. With AMD struggling to cope with the explosive R&D costs for the Athlon, these new revenue sources will be crucial for the company's survival.



to get them to switch you've got to literally get in their face."

And that's what it's come to. AMD has a new mission to put its name up in lights, starting with its largest global branding and advertising effort in the company's 33-year history. The goal is to establish an "empathetic, personal connection" between the chip inside the PC and the person at the keyboard.

Workmen have been gluing, painting and wallpapering billboards up on street corners, train stations and phone booths. From windswept bus shelters in remote suburbs on city outskirts the AMD logo stares out into space while banner ads have popped up on Web sites everywhere.

There's an untapped ocean of potential customers out there, but winning them over first requires AMD wean them off their Intel Inside habit. In shops, AMD has resorted to sending out teams of "discrete sellers" who teach shop assistants how to pitch budget-priced AMD systems amid boxes full of Intel gear.

HARD TO KICK THE INTEL HABIT

Robinson suggests that in offices Intel is often being used out of sheer habit. When you've been buying Intel for 10 years, why bother changing? So while the white-coated lab boffins dream up the tech, Robinson and co are out on the road, flogging to the suits the benefits of 64-bit and Athlon chips like high-tech vacuum salesmen. Tech this complicated should be studied in books for hours, benchmarks analysed closely, but for AMD it's often a case of spruiking its wares door-to-door.

That's not to say everything depends on these cutting edge toys. Robinson says AMD's push into offices and notebooks will depend just as much on its bread-and-butter Athlon technology. He takes us into his offices and, as if to prove the chips are capable, he shows us a demo room full of Athlon processors. It turns out the server humming away behind a perspex showcase in the corner isn't just for looks, it also doubles as the office's real network, feeding the spreadsheets that appear on the managing director's desk.

But despite the can-do demos, analysts like Bertram argue people lean towards Intel. "For

a lot of corporate enterprise buyers, there's no reason why AMD should be a consideration risk. But a lot don't put it on the list. It takes the attitude, better the devil I know than the devil I don't," says Bertram.

"It's that comfort zone. The comfort you have in buying a brand. You link stability; the fact the company has good financial reports... with the brand. With AMD you don't have that linkage. You have the linkage that it's a low priced competitor."

INTEL: THE ROCK AND ROLL CHIP MAKER

Meanwhile, Intel increasingly imitates pop culture icons like Sony and Coke, rather than

Pentium 4. According to the benchmarks, the new chip had actually gone backwards in raw speed. How could a new chip with a faster clock speed, they asked, run slower than the earlier Pentium III or AMD's Athlon?

It's an ongoing battle punctuated by confusion over the technology and an uncertain future. Robinson says AMD's local arm is close to achieving 100,000 shipments per month, or about 25% of the locally manufactured PC market, but the future looks tough.

The semiconductor industry is battenning down the hatches for several years of doldrums — sales growth will be more like 10% or less, rather than the 16% of the gold rush days. And

while AMD fiercely defends its chip performance, Athlon clock speeds are falling further behind the Pentium. Faster memory, better bus speeds, demanding video performance are all putting pressure on the CPU — in this category Intel still packs a mean punch.

AMD: FIGHTING THE GOOD FIGHT

Talking to Robinson, it's hard not to feel as though AMD would be short-changed by a descent into BetaMax-like obscurity. "If AMD didn't exist, processors probably wouldn't be above 1GHz today, and they would probably still be \$1,000 today, just the processor alone. You'd probably pay \$10,000 for a PC, because there would

have been no competition to drive the pricing down," he boldly says.

Yet despite having a new CEO, a new ad campaign, and a new chip that's got some attention, it's still a fight for the limelight. When Intel launches 64-bit, AMD is there. Intel gets into wireless and AMD is right behind it.

Beyond the CPU, Intel has PCI-Express, while AMD has HyperTransports. Chip speeds go ever upwards, while the two vendors cut prices within a week of each other. All the while, AMD moves farther away from its home PC roots.

It's an uncertain future in which AMD must cope with complex chips, consumer confusion and an all-powerful technology giant. Latching hold of the consumer can't be easy in a world where PCs are increasingly becoming mainstream appliances, advertised on every bus shelter and billboard, and where Intel ranks alongside names like Coke, Disney and McDonald's in popular consciousness. But then everyone loves an underdog. **ETTU**



► **Leading the push:** AMD's Australian managing director, John Robinson.

a computer chip maker. While AMD puts up posters and expounds its bang for buck philosophy, Intel has been running new TV advertisements, fast-paced 30 second spots set to music like Moby. People dance, jump into taxis and ride mountain bikes, all without any mention of chips, bits and gigahertz — it's MTV, Silicon Valley-style.

At the same time, AMD is desperate to illustrate the speed of its chips, despite downplaying the importance of GHz. Marketers are even renaming the chips with faster-sounding model numbers. They argue benchmarks are too confusing and don't paint the true picture.

AMD is working on a new chip comparison it hopes to promote in shops. Under this "True Performance Initiative" the tables would be turned, putting AMD on top, not Intel.

Just how confusing processor performance has become was made plain last August when a small group of PC owners in the US sued Intel and PC makers over the performance of the



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RaQ550	1gHz	256MB	40GB	\$1,649	\$5,490
RaQ550	1gHz	512MB	2x80GB	\$2,249	\$7,490

Dell PowerEdge 1650 with Redhat Linux

model	RAM	hard drive	quarterly	annual
PIII 1.13 GHz	256MB	18GB	\$2,500	\$8,600
Dual PIII 1.13 GHz	512MB	2x18GB	\$3,300	\$11,300

Dell PowerEdge 1650 with Windows 2000

model	RAM	hard drive	quarterly	annual
PIII 1.13 GHz	256MB	18GB	\$3,000	\$10,200
Dual PIII 1.13 GHz	512MB	2x18GB	\$4,000	\$13,600

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Why Web usage is drying up

The number of Australians using the Net is falling while hopes of breaking a looming online recession lie with next-generation mobile devices or a broadband price war. *Fiona Angus reports.*



Fears the Net may have hit critical mass are growing after the number of Australians using the Internet last year fell for the first time ever. Now the IT industry is asking why Australia, a nation of early adopters and a barometer for tech trends, is turning off the Net.

Independent research by Melbourne firm MISC Australia (Market Intelligence Strategy Centre) revealed an unprecedented 300,000 Australians abandoned their connection.

Net uptake among Australians has only ever risen since MISC began tracking usage patterns in 1999. Growth remained unstoppable even after the dot com crash and the global economic downturn. Then, in the June quarter of 2002, the survey registered its first period of stagnation. "The data certainly seems to suggest it has all the classic symptoms of a mature phase," says a spokesperson.

The results suggest this could be more than a short-lived market correction. Even before the data "went negative," the research team was closely monitoring unusually flat growth patterns in the previous quarter.

The downward trend is mirrored in other research showing flat growth in Net access and usage patterns. Australian Bureau of Statistics (ABS) figures gathered from Australia's ISPs show overall subscriber numbers fell by 43,000 to 4.23 million, while 32 ISPs closed in the six months to March. In April, a report commissioned by the National Office for the Information Economy (NOIE) identified the key virtual and physical ceiling that was blocking a third of the population going online.

"Despite the emergence of access technologies such as digital television and Internet-enabled mobile phones, the PC remains the predominant Internet access technology in the home," NOIE stated.

They found that while 52% of households have Net access, only 67% have a PC.

BROKEN DREAMS

During the tech boom, it was assumed logging on would be as universal as watching TV. Gartner PC analyst Andy Woo explains the Net helped drive a pre-millennium boom in PC sales that saw spectacular double-digit growth in 1998 (22%) and 1999 (10%). Apple managed a comeback by dressing up a 233MHz, 32MB, 4GB box and calling it the "Internet-age computer" (aka iMac). Soaring economic and consumer confidence also helped feed a new generation of Web content creators and Y2K peddlers.

When the crash came in 2000, PC sales declined by 1.5%. Sales had never fallen since the computer was invented. What was hoped to be a temporary lull soon turned into a savage downturn when sales fell by 9% in 2001. "When I say bottom, that was bottom," Woo recalls.

The IT industry is now coming to grips with the fact that almost everyone who wants a PC already has one. "If you look at the professional space and the corporate space in Australia, it's a replacement market. It's saturated," says Woo.

Gartner estimates the PC install base for business is around 80% and 45% for households. "There is only limited growth left in the home market," Woo says.

The mild recovery during 2002 was driven by upgraders rather than new users. Suppressing further sales is the trend to extend the life of a PC up to four and a half years rather than two or three. Woo fears the current Y2K-driven upgrade cycle will peter out in 2005 and set the stage for another period of stagnation. "Given that whatever needed to be replaced will be replaced this year or next year, what are the compelling reasons for end users to upgrade?" he asks.

There's no looming killer technology ahead to jump-start the market, says IDC Australia hardware analyst Darian Bird. The basic PC setup hasn't changed much since Net access was built into Windows 98, inbuilt modems

became standard and mainstream apps stopped demanding more than 128MB of RAM. "1.5GHz or 2.5GHz? For a lot of consumers, it's all the same really," Bird says. "The only core development involves improving security."

WHERE NEXT?

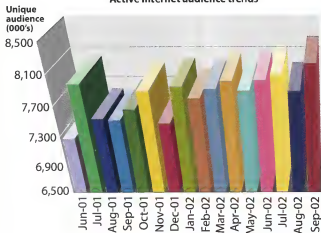
When PC growth stopped, so did the ability of new Web businesses to find fresh audiences. Woo and Bird suggest that the PC will only get incremental usability improvements such as a smaller form factor, flat screen and legacy-free expansion options. Even the iMac has branched out, offering an 800MHz, 256MB, 80GB, DVD-burning, widescreen LCD experience. While analysts expect the desktop will survive, the next growth wave will be in mobile and wireless devices.

Yet these alternative devices (like new combo handheld/mobiles and Tablet PCs) are out of reach for all but big-spending businesses and have yet to prove their worth in the real world. At the same time, mobile Net access over GPRS (the so-called 2.5 generation network) is expensive and tops out at around 50Kbit/s, while high-speed 3G networks remain in their early stages.

Hopes of delivering broadband through television set-top boxes or a "home entertainment server" have been limited to small projects like Optus' Sydney ITV trial and Canberra's local Transact powerline-based broadband network, which delivers high-speed Net access, telephony and TV services through a central set-top box. Yet these aren't mainstream.

The MISC team suggests that Net uptake will only rise again when high-speed wireless networks and mobile devices hit the streets. "We take the view that in terms of uptake, talking about this in a collective sense, things will plateau until such time as the new wave of technology takes hold," says the MISC spokesperson.

Active Internet audience trends



► **Flatline:** Net audience trends remained patchy during 2002. Source: Nielsen/Net Ratings

At the very least, the Net is looking at a 12-month recession. "The top portals and sites have experienced only slow growth over recent months," says Nielsen/NetRatings marketing director Mark Henning.

Its research shows Internet uptake plateaued in the second half of 2002, although numbers are still 10% up on 12 months ago. "Not surprisingly, when you reach these levels of penetration the growth rates of one or two years ago are not sustainable."

The fledgling industry is already struggling against a trend that emerged in the second half of 2001 when existing Net users began spending less time online.

Tessa Court, a senior vice president with measurement firm Hitwise, explains Net browsers are becoming more focused. "For example, when people are not secure about the investment climate, the overall volume of traffic Hitwise sees to the online brokerage category falls."

News and portals are suffering a major slump, plunging from almost 10% of all traffic in September 2001 to less than 6% a year later.

Australia's experience over the next 18 months will be closely monitored by information economies still caught up in the euphoric early growth phase. While Australia suffers, a UN report estimates a dramatic surge in new Net users in developing world regions helped fuel a 30% global jump in 2002.

BROADBAND: DROUGHT-BREAKER?

The only wildcard that could spur Net and PC growth is broadband. However, the download restrictions on an affordable home account prevent data-heavy applications and media. Woo, Bird and the MISC team agree a broadband price war could catapult us out of the slump. Yet price alone may not be enough to crack the PC ceiling and attract new audiences.

When Telstra asked former dialup users why

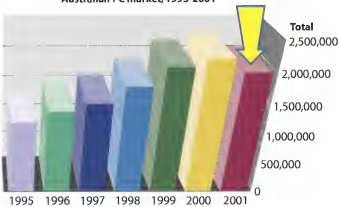
they had ditched their accounts, they discovered half had moved to their broadband service. In fact, internal figures show about 80% of new BigPond broadband connects had come from a dialup service. Telstra Retail public affairs manager Kerrina Lawrence says 10% of broadband customers also keep their dialup account.

The broadband market operates like the replacement PC market: it cannibalises

rather than creates new users. "Very few new broadband customers would not have had dialup previously. It's very much a journey from dialup; either a need for speed or access to higher bandwidth applications. That's usually the hook."

The MISC team point to the variety of factors feeding the decline in Net users. "There is no killer issue that has caused this. It really is a combination of things." ■

Australian PC market, 1995-2001



► **Rock bottom:** The number of new PCs sold in Australia falls for the first time ever. Source: IDC

Traitors to the PC?

Are the companies that built their fortunes on the PC forsaking their roots?

DELL: Michael Dell told a recent conference that the majority of its profits now come from "non-desktop computing" and the company has "evolved" from a "desktop-centric" company into broader products and services. Dell's Australian marketing director, Rob Small, believes that "the future for us in the PC is still very strong, very rosy, but it will become a declining part of the overall mix."

The classic PC equation (more power for less money) is feeding a hand-me-down market among Australian families. "Our mix is very heavily weighted toward P4 systems, we don't sell very many Celeron-based systems," says Small.

PCs are lasting longer. "The richer the configuration they buy, the longer it will last. So in terms of total cost of ownership, in terms of lifecycle, they may be able to get three and a half to four years."

Broadband adoption is also beginning to make an impact. "If you're streaming movies and playing games, you need a decent grunt machine... So we tend to find people that have a broadband connection at home are buying a very rich configuration."

MICROSOFT: At the recent Australian launch of a combination handheld/phone running Windows Pocket PC Phone Edition, Microsoft chief executive Steve Ballmer said that for the past three years, the ruler of the PC platform has been adapting Windows for alternative devices and "not just the PC".

Microsoft Australia product marketing manager Tony Wilkinson states Microsoft does not believe the Windows desktop has hit saturation-point. "There are many consumer devices that have higher penetration rates than PCs do today, but provide less value than a PC can."

"We see PCs doing more over time — for example, providing a hub for home entertainment and communications."

In business, he says PCs will trickle down from "knowledge workers" who process information to frontline "information workers."

"While it is true that we have extended Windows to operate on a range of new devices (and will continue to broaden this device support), the PC remains the single most important device for interacting with information both at home and in business."

Need to Know Watchdog

Communication breakdown

What can you do if you invest in the latest technology and it falls short of your expectations?

Dear Watchdog,

I purchased a Sony CLIE T665 in September. The design of the unit is pretty good, but I noticed the Graffiti handwriting recognition was quite poor. In fact, it is much less accurate and slower than my old Palm Vx. For example, the Ps and Ds often come out wrong. I had no problems with the same letters on the Palm.

I emailed Sony tech support and was advised to do a hard reset and recalibrate the system. This made no difference at all. I emailed its Australian Web site and requested they either refund or exchange it for a model with keyboard input (like the NR70). I then spoke to a customer service representative who explained there was no repair they could perform to make it better and suggested I contact the place of purchase for an exchange. Given the nature of the difficulty, that seemed quite inappropriate. This appears

to be a problem in the CLIE, which is all the more disappointing coming from a company which prides itself on high-quality products. I would have at least appreciated some acknowledgement of the problem from Sony.

Justin Baker
Caulfield, Vic

Justin asked the retailer he bought the Sony CLIE T665 from if he could exchange it. It was explained that after a product had been opened, it followed Sony's warranty policy. Therefore, it was up to Sony to decide whether Justin deserved a refund or not.

Dear Watchdog,
We understand your frustrations and would like to help clarify some of the CLIE issues you mentioned. Firstly, the technology used in the CLIE for the graffiti handwriting recognition is exactly the

same as Palm (the CLIE is a Palm-powered handheld). We acknowledge you may be experiencing difficulties because of a slight difference in speed that could result in some inaccuracies in recognising your Ps and Ds. This is most likely due to the difference in hardware between CLIE and Palm handhelds. It is unfortunate that you felt your concerns were not addressed through our customer service and we hope that this response goes some way to clarify your situation. We wish you all the best with your future CLIE use.

Brett Bowden
Sony Australia Product Manager for CLIE

In an effort to improve his handwriting recognition, Justin went to an independent online CLIE forum and asked other users if there was anything he could do to his CLIE that might help. Suggestions included writing larger, pressing harder and using Graffiti software such as TealScript and MessageEase.

Contact us

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how IT companies are really treating you. Write to: watchdog@apcmag.com or PO Box 4088, Sydney NSW 1028. Include your full contact details and any product information. All correspondence becomes the property of APC and is subject to editing.

Broadband monitoring

Australia's long-suffering broadband community could finally have some relief under a proposal to monitor the performance of high-speed Internet Service Providers. The Australian Communications Authority (ACA) is investigating the possibility of introducing industry-wide performance monitoring of broadband services later this year.

The ACA currently monitors fixed-line and mobile services. It also administers the Government's Universal Service Obligations (USO), a regulatory safety net that gives every Australian equal access to basic telecommunications services. These guarantees don't cover ADSL and cable services and there is no independent performance information available for Australian broadband users. The move to bring some accountability to the broadband industry follows concerns that the quality of service is a barrier to new users.

The ACA released a discussion paper to canvass the idea (www.aca.gov.au) and identify issues involved in administering new broadband networks and delivering high-speed Net access to consumers. Possible performance ratings include network downtime, congestion, transfer rates, download caps, fault repair delays and customer assistance.

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- Full digital colour A3 printing at 16ppm
- Over sized A3 printing
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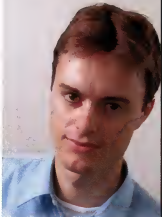
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with William Maher

Sweeping bugs under the rug

With the security bug industry squabbling over critical issues, how can we be sure we're being protected, and will security in the future be available only to those who can afford it?



When a security flaw was discovered in Internet Explorer 5.5 and 6 recently Microsoft was quick to alert customers, but not everyone was happy. Security expert Thor Larholm was worried that the flaw was more serious than Microsoft was letting on, and said so on BugTraq, one of the Internet's many security alert sites. It turned out he was right.

"Information posted to NTBugTraq ... prompted an investigation that uncovered a previously unknown exploit scenario," a chastened Microsoft conceded. "The newly discovered exploit scenario ... could allow a malicious user to run code on a user's computer via a specially crafted Web site or email message — thus warranting a severity rating of critical."

Thank goodness for BugTraq. With more security holes being discovered daily (the IE bug was one of two major flaws found in Microsoft products in two weeks) sites like BugTraq and commercial "alert" agencies are becoming important in warning PC users and sometimes software vendors themselves about security holes. They're the front-line defenders of cyberspace, helping to protect us from the thousands of viruses, worms and hackers threatening to invade whenever we install buggy software on our PCs.

But the sheer number of these threats is causing havoc for the agencies like BugTraq that first report them. Spill the beans immediately and Christmas comes early for Johnny-hacker before Microsoft has a chance to prepare a fix. Wait, and you're holding onto a dirty little secret about software installed on millions of PCs.

In an attempt to cope with the disclosure headache, data security provider ISS has now unveiled an official policy giving

To put it another way, if hospitals started giving Bill Gates and his Lexus-driving Fortune 500 buddies advance warning on deadly influenza outbreaks, then tried to charge the rest of us for a needle-jab, would that sit well with you? This post to Internet discussion site Slashdot sums up the concerns: "The ISS policy represents a regression back to the old way of doing things, except now the cadre of people in the know are the ones who can afford to pay ISS for advanced vulnerability information. Presumably the rest of the world has to suffer and get hacked."

Alarming as that may be, for these companies it's just business. Up-to-the-minute security alerts are a growing niche market for security companies looking to make money. But what about the rest of us who are being kept in the dark? Some comfort an "X-Force" is to the thousands of Net users running around with buggy browsers. You may as well have a "hack me" sign taped to your back.

It gets better. Last year Hewlett-Packard threatened a researcher who posted a message to BugTraq exposing holes in HP's Tru64 Unix operating system. The note included a link to a program that would let users take over a machine. HP threatened fines of up to US\$50,000 and five years' jail. The company later backed off on the threat and a patch was released to fix the software.

Legal threats, cash for bug alerts, playing games with disclosure rules — it's all casting a shadow over the ability of reporting agencies and software vendors to deal with the responsibility of protecting us. "I don't think that there's a conspiracy to deny end users of the information," says Internet Industry Association (IIA) Chief Executive Peter Coroneus. "But with so many sites, which ones do you go to?"

Millions of PC users are relying on sites like BugTraq for early warnings, but who is watching [them] to make sure we're getting the right information?

software vendors a 30-day head start to fix holes before alerting the public. After the 30 days the wider public gets let in on the secret, though this happens earlier if the threat somehow already becomes widely known or hacks begin (as well as other exceptions).

Before you scream blue murder, there might be a shred of intelligence here. Releasing the news too early would be giving hackers a free ride into unprotected systems. However, if you happen to be a paid-up member of ISS's X-Force security service, then the wait doesn't apply. After a 24-hour wait to warn the vendor, ISS comes rushing with news of the potentially crippling security hole, while the rest of the world goes about their business.

This is not an isolated case. When the Internet Software Consortium (ISC) discovered a flaw in crucial domain server software, it reportedly withheld patches from people not members of a special early-warning service, and then urged some to pay instead of emailing them the fix.

Who do you trust? The IIA and Net monitoring body Auscert both have free alert services planned this year for Aussie SMEs, which doesn't say much for their confidence in the existing alert services.

For anyone who thinks the concern is too paranoid, fair enough. The average user probably hasn't patched their version of Outlook since installing it a year and a half ago. Who cares about having up-to-the-minute alerts? Everybody, when Code Red or Nimda, or the next panic-inducing virus hits. Millions of SMEs, corporations and PC users are relying on sites like BugTraq for early-warnings and to keep big players like Microsoft in check, but who is watching to make sure we're all getting the right information?

Is this what it's come to? Buggy code installed on our PCs while the security cowboys turn the debate into a nice little earner. They're playing favourites, turning the digital landscape into a game of haves and have-nots, and it's the average PC user who loses out.

wmaher@apcmag.com

Love the Mandrake

I just want to express my appreciation for the Mandrake installation on your CDs (APC November 2002). I have been trying various kernels on a machine which I cobbled together from second-hand parts because I didn't want to try Linux on my main machine until I had seen how it performed.

I got Linux running from a CD obtained locally, but it was Knoppix running in memory which meant a complete load every time I wanted to use it. I found this a bit tedious so when I saw the discs available with your magazine I thought it would be the solution to my dilemma. I had some trouble at first because I was trying to load it on a machine with only a 1.2GB hard drive. However, after trying a few times I got it running this morning by only loading one desktop.

As I keep telling everybody, "It's all much easier at 18 than 80" and I haven't got anybody to talk to about any problems, so you can take some satisfaction from helping at least one person on the way.

Alan Tazer,
Christchurch, New Zealand

Alan's experiences with Linux are testament to the growing market for alternative OSes. Have you had any defining OS experiences you'd like to share? Let APC know.

BEST PRACTICE?

I followed the advice of the official Microsoft "Windows Update" Web site and downloaded and installed the "critical update" Microsoft Internet Explorer 6 Service Pack 1 for Windows 98, Windows Me (the latest official version of their Web browser).

While I was a reasonably happy user of version 5.5 and 6.0 of the browser, this new

release was an unstable mess that frequently crashed Windows completely, whether surfing the Web or not. Even when it was uninstalled it left an unstable, new, automated bug-reporting tool in place to ruin the reinstalled and previously stable old version 5.5 and even corrupted Windows itself. I had to reinstall all of my software from scratch on my PC again, along with the earlier version of the browser to regain a stable PC. It's not just me and my own PC — the massive instability of this "upgraded" product is noted in a volume of CNET reviews.

It seems that at least with its browser,

Microsoft has been taking a step down in levels of reliability. What has made my impression worse is that I attended an official Microsoft-sponsored function (at a Microsoft office) recently and met one of the senior product development team leaders from America. To my surprise he eventually indicated rather honestly that there was no formal project management methodology to control

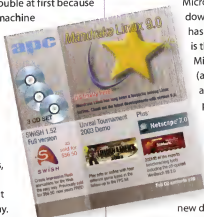
new developments/releases for this product; there was no design/development methodology in place (because they keep people for a long time so it was not needed), and that he wasn't personally aware of the nature of any structured design or project approaches for other Microsoft products.

Rather than change business processes which lead to unstable software releases, it appears that the culture being promoted is that it is okay to release sloppy software because when people complain they can hopefully release fixes quickly onto their Web site. Too bad if your PC has crashed and you can't get to the Web site again to undo the damage from the latest service pack that caused the problem.

Blair Robertson
Via email

Have your say

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Letter of the month

I installed ZoneAlarm v2.6 shareware after reading a favourable review of it in your magazine. It has been reliable and effective for months until I changed my browsing configuration and no longer required it. I changed from dialup using a Windows 98 machine to ADSL connected to a FreeBSD (Unix) machine, surfing from the original Windows PC via a hub connected to the BSD PC.

Naturally enough, ZoneAlarm would not allow connection. When I was visiting friends, and using their ADSL connection, I merely used ZoneAlarm options to "shutdown" ZoneAlarm, and everything was fine. But on reconfiguring my system, first I told ZoneAlarm not to start up using ZoneAlarm settings. No joy. It still blocked Internet access. Then, using msconfig, I told it again not to start up. Finally, I uninstalled it using Microsoft Control Panel Add/Remove Programs. This final step caused an error that prevented Internet access and prevented Windows booting. Not even reinstalling Windows would make it go away.

Eventually I checked the latest APC CD and installed ZoneAlarm 3.1, then shutdown, restarted then uninstalled version 3.1. This finally resulted in a clean uninstall and fixed the error that prevented Windows from starting and from connecting to the BSD machine and the Internet. Hooray, but it took hours. I thought it might be nice to include in the magazine or on the CD a troubleshooter that would cover things like this, especially where the problem prevents Internet access. I was lucky that I had installed a dual boot system on the BSD machine, so eventually we were able to use that to track the problem to ZoneAlarm.

Janet Scott
Adelaide, SA

Janet added that this is an issue documented by Microsoft. Check <http://support.microsoft.com/default.aspx?scid=KB;en-us;q291793>.

Janet's letter of the month nets her FlashMemory's Cruiser USB Flash memory reader. Supplied with a 128MB SD card, the prize is valued at \$233.



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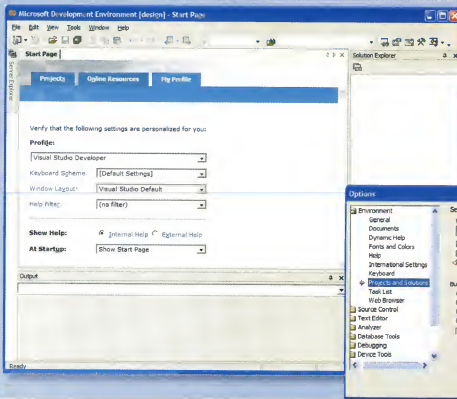
Video cards

18 slices of video silicon given a workout.

Handhelds

A new crop of handhelds under scrutiny.





Tabs a-go-go: the new, revamped Start Page is now broken into tab pages for easier navigation.

Tool time: the Tools/Options menu now contains a new environment setting to make the Solution Explorer keep track of the file you are working with.

Developing the .NET

David Williams dives under the covers of Visual Studio.NET 2003, Microsoft's .NET development environment.

Visual Studio.NET 2003 is on the way, barely a year after the debut of the 2002 edition. But it's hard to consider this as anything more than a service pack to VS.NET 2002, albeit a good one. The changes are sensible but small — the inclusion of the Java-like Visual J#.NET language, improvements to the

development environment and to the underlying .NET framework to introduce support for mobile devices.

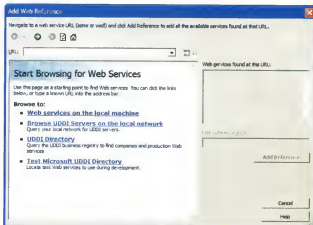
At the time of writing, pricing for VS.NET 2003 hadn't been released, but the upgrade cost is what will make this a no-brainer buy or a "can live without it" for owners of VS.NET 2002. Our preview was based on the beta 3 release code of VS.NET 2003, with the finished product due around April.

To recap, Visual Studio.NET is Microsoft's suite of software development tools (Visual Basic, Visual C++ and the new C# language) that target the .NET platform. .NET, in turn, is the fusion of Windows- and Web-based programming technologies, with rich Inbuilt support for memory management, database connectivity and wireless and handheld devices.

Whereas previous programming languages would generate pure machine code to be executed directly by a microprocessor, the .NET family of languages generate an intermediate binary language known as MSIL (Microsoft Intermediate Language). The MSIL code is then executed on top of the .NET runtime environment.

The benefit is that the .NET languages can access all of the functionality provided by the .NET class libraries, user interface components and utility routines. Together, all these items constitute the .NET framework.

The flow-on effect is that whatever the .NET framework supports, such as handheld devices and editing information that's disconnected from a database (to be later synchronised with the database when the PC is back online), then so too can your programs.



► **Avoid conflicts:** the Project/Add Web Reference menu now allows Web services from the local machine to be found and used.

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Visual Studio.NET takes seriously the fact that all of its different programming languages ultimately generate code for the very same platform, and provides a suite of languages which are fully matched in features. For example, Visual Basic in its .NET clothes provides structured exception handling and true object-oriented features, while the .NET version of Visual C++ can be used as the back-end code to produce dynamically-generated Web pages.

COSMETIC IDE CHANGES

The first changes in the Visual Studio.NET integrated development environment (IDE) occur on the Start Page. It's still possible to set preferences for the IDE's behaviour, and to create new, or re-open existing, projects. However, these are now easier to navigate with individual tab pages, while an Online Resources tab contains useful Microsoft related online developer resources.

A new item, Track Active Item in Solution Explorer has been added to the Tools/Options environment settings. When this option is checked (the default action), the Solution Explorer automatically opens the folder for the active item, scrolls to its node and selects its name. The selected item changes as you move from file to file within a project or solution. When the option is cleared, the selection in Solution Explorer does not change automatically.

This is especially helpful with projects containing many files, which would otherwise require scrolling the Solution Explorer.

Additionally, if you have a source code control system in place (which helps avoid conflicts when more than one developer is working on the same body of code), the Solution Explorer will display icons to indicate if a file has been checked out exclusively — so that only one developer can edit the file — or for shared use. This means that many developers can work on the file with the source code control software merging the edits upon checking the file back in.

Using the Project/Add Web Reference menu now provides welcome links to both local and Internet sources of available Web services. This menu is used to locate desired Web services and enter a Web reference name to use in program code. The new reference appears in the Solution Explorer under the Web References node for the active project. In order for the local link to return information, Internet Information Services (IIS) must be installed and running on the local computer.

Goodbye DLL hell

An especially nice aspect of VS.NET 2003 is that it will not attempt to interfere with an existing VS.NET 2002 installation. This allows developers to run both environments side-by-side without any problems. The fact that the two frameworks can happily co-exist not only offers relief to suffering programmers, it also proves that .NET does indeed solve the much-touted "DLL Hell" scenario.

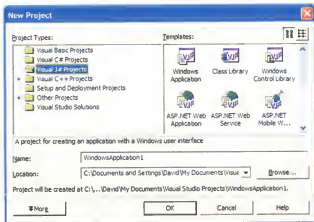
Prior to Windows XP and .NET, DLL conflicts occurred because applications were unable to distinguish between incompatible versions of the same code. Type information contained in a DLL was bound only to a file name. An application had no way of knowing if the types contained in a DLL were



► **Up to date:** Visual Studio.NET 2003 upgrades existing .NET code before opening

the same types that the application was built with. As a result, a new version of a component could overwrite an older version and break applications. A different object that had the same filename could overwrite an existing object. This has been a pain for network administrators for years, where a user's pre-existing application will be broken, and the problem may not be realised for some time. By then, the hapless user will see no relationship between the breaking and the installation of the new program.

It's important to realise, however, that a project created in VS.NET 2002 and opened and saved by VS.NET 2002, can no longer be re-opened in the 2002 edition. This is because the original environment shipped with, and targeted, the .NET framework version 1.0. The new Visual Studio.NET 2003 ships with, and targets, the .NET version 1.1. When Visual Studio.NET 2003 opens an app that references the 1.0 framework, it updates all references to the 1.1 framework.



► **Java jive:** the new language, Visual J#.NET, has a Java flavour and is just as capable as any of the other Visual Studio.NET languages.

SORTA, KINDA JAVA

After a notable absence due to legal wrangling with Sun Microsystems, Microsoft's Java-like Visual J++ language returns under the guise of Visual J#.NET.

This new language offers just as many project options as Visual Basic.NET, Visual C++ .NET and C#.NET: namely Windows applications, Web applications, console applications and Windows services. This adds much greater flexibility and variety, allowing programmers a choice of four equally-capable programming languages.

However, two caveats must be noted.

Most importantly, J# is not Java. It doesn't target a Java virtual machine, it doesn't generate Java class files and it doesn't produce cross platform code. What it does is provide a solid environment for producing .NET code which will be a comfortable and familiar environment and language for Java programmers who wish to migrate to .NET. This is clearly an attempt to woo Java developers

over to the .NET world.

Existing J++ (and other Java) projects can be opened in J#, with a project conversion wizard automating the bulk of the work in moving to .NET, namely user interface components and class library calls.

This introduces the second caution: some aspects of Java cannot be migrated. These include native methods, remote method invocation and other low-level Java class libraries that are considered proprietary to the Java standard.

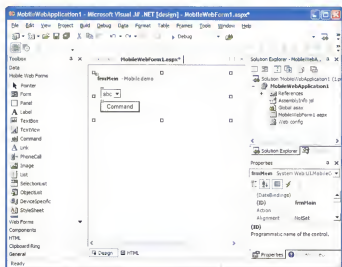
THE NEW .NET FRAMEWORK

One of the most significant changes in Visual Studio.NET 2003 is the introduction of the latest revision of the .NET framework itself. Because this foundation provides the real functionality of .NET, any new features in the .NET framework immediately mean new features available to programmers in any of the .NET languages.

One such addition is the introduction of the ASP.NET Mobile Controls, formerly known as the Microsoft Mobile Internet Toolkit. This suite of controls provides support for portable wireless devices such as mobile phones and handhelds, so that creating sites for mobile devices is now no more complex than writing an ASP Web site or even a Windows-based application — it just comes down to which project type is used when creating the application.

The ASP.NET Mobile Controls extend ASP.NET server controls such that they adapt to the mobile device on which the Web application is rendering. This means that the mobile controls conform to the capabilities of individual devices, via browser detection, irrespective of whether the target device is a full-featured PDA browser or a small mobile phone display. Consequently, programmers can write just the one site without having to consider device-specific rendering.

Another bolster to the .NET framework's muscle is the data provider for ODBC databases. This was previously available as a Web download only but now comes out of the box under the namespace System.Data.Oracle. A Data Provider for Oracle is also included, under the namespace System.Data.OracleClient.



Mobile Internet Toolkit: writing a Mobile Web application has never been easier.

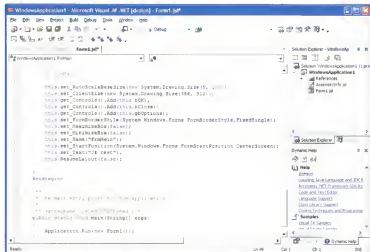
These increase flexibility in working with diverse database systems.

As before, the .NET data-aware components (such as datagrid) will work just as well with any data provider, so applications can be migrated from Access through to SQL Server or Oracle with no change to the fundamental program logic, merely the invocation of an initial data provider.

The third major change to the .NET framework is support for the emerging IPv6 protocol. IPv6 is designed to significantly increase the address space used to identify communication endpoints in the Internet to accommodate its ongoing growth. IPv6 is natively supported in the System.Net namespace, and by ASP.NET and XML Web Services.

IMPROVED DEBUGGING

A sad truth is that any complex computer programming effort is going to include faults in logic and design. The Visual Studio.NET 2003 debugger has been enhanced by improved error messages (particularly for errors that occur while debugging Web applications), and by adding the ability to step into the code behind an XML Web Service just as easily as you might step into a VB.NET module.



Look-alikes: I can't believe it's not Java!

Further, the debugger is strengthened by the inclusion of a new tool called, aptly enough, SOS. This is used not for conventional debugging of a running program, but rather for examining the state of a crashed program just prior to its failure. This means you must have a tool available (like Dr Watson) which can generate dump files when a program crashes. SOS can then load the dump file and inspect the computer's state just prior to the crash.

In summary, Visual Studio.NET 2003 is, like its predecessor, a solid and high-quality development environment for writing full-featured Windows applications. Those new to .NET or programming in general will find it an excellent platform.

However, existing VS.NET programmers may feel there's little of value for them. And while the inclusion of Visual J#.NET is welcome — especially for existing Java developers — new programmers will be spoiled for choice between C# and Visual Basic. [\[1\]\[2\]](#)

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scalability



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Empowering People



► **Light work:** the VAIO FXA10 is a full desktop replacement weighing only 2.9kg.

but still manages to offer AGP 4x, ATA/66 and 133MHz memory bus support, and a 200MHz frontside bus. It compares favourably against the earlier FX950, which uses a Celeron 900 and Intel's 815EM chipset. Users should be aware that USB support is limited to USB 1.1.

So how does the Mobile Athlon XP run? For what is considered the equivalent of a 1.4GHz Pentium 4, the Athlon XP manages to churn through the benchmarks at a steady clip. Its Winstone score of 34 means it falls just below the high-performance Toshiba Tecra 9100 in the context of the August 2002 line-up, so the FXA10 is in good company. It doesn't rate as a top class performer against the highest offerings on a Pentium 4 platform, but it fares reasonably well running general office applications.

SUM OF ITS PARTS

Don't expect any fancy graphics though. The ATI Rage Mobility-M1 graphics adaptor is nominally rated an AGP 4x device, but it's been around a long time and should be superseded very soon. We couldn't even test it with 3DMark 2001 Pro, and the Quake III Arena demo test would not run at our preferred resolution of 1,024 x 768 pixels. The frame buffer on the Rage Mobility-M1 implementation is only 8MB, making it no match for some of the latest mobile graphics adaptors.

At \$2,899 though, there's a lot of functionality in the box.

Sub-\$3,000 notebooks are often highly compromised machines, and usually with Pentium 4 notebooks in this price range you'd expect to see a dodgy implementation using a desktop CPU and elaborate cooling. It's not surprising most efforts in designing mobile CPUs are directed towards reducing weight, thermal dissipation and increasing battery life.

But it was on these points the Mobile Athlon XP 1400+ in the FXA10 makes the grade. Unlike many of the Pentium 4-based notebooks APC has seen recently, the VAIO can run full-bore on your lap without leaving a brand on your thigh. Battery life was generous, taking two hours and 19 minutes to run down with all power management disabled. An optional second battery can be fitted in place of the floppy drive.

As always, the software bundle was extremely generous, including Windows XP Home Edition, Norton AntiVirus, Adobe Photoshop Elements, WinDVD player, and a suite of Sony software like MovieShaker, DVgate, SonicStage, PictureGear and SmartCapture.

From a technology standpoint there's not much to make the FXA10 turn heads. Yet it's still a good budget-oriented notebook with a solid feature set and a price tag that will ensure popularity for anyone wanting to dip their toe into portable computing.

David Lin

An Athlon to go

Sony takes a punt with AMD to power its new budget portable. The price is right, but is the performance?

You won't find AMD's Mobile Athlon XP processor in many notebooks on the Australian market. To our knowledge, Sony is the only one of the major brands to be shipping notebooks armed with this chip. Catalogues in the rest of the world abound with AMD-powered portable computers but for some reason these models don't see the light of day here. Most vendors argue that corporate and government customers avoid AMD — and without acceptance in these areas, the major brands will not risk bringing in AMD-platform notebooks.

The VAIO PCG-FXA10's central processor is a Mobile Athlon XP 1400+ and it comes with a combo DVD-ROM/CD-RW, 14.1in TFT display, iLink (FireWire), floppy drive, modem and Ethernet built into the box.

TRIED AND TRUE

In looks it resembles the plain, austere lines of the FX950 model that graced the pages of our notebook road test issue (APC August 2002, page 67). There's little to distinguish between the two models outwardly with the exception of the absence of the three buttons next to the power button on the FX950. There was some concern about the quality of the workmanship as some of the plastic panels flexed more than they should have. One small panel on the right side persistently snapped off whenever there was any pressure brought to bear on that side of the chassis.

The Athlon XP 1400+ processor is married to the VIA KT133 chipset — which is a bit long in the tooth these days being the first VIA chipset for the Athlon and Duron. It doesn't use DDR SDRAM, preferring PC133 SDRAM,

Details ►►

Processor	AMD Mobile Athlon XP 1400+
Memory	256MB PC133 SDRAM
Hard Drive	Hitachi DK23DA 30GB
Display	14.1in TFT
Video	ATI Rage Mobility-M1
OS	Windows XP Home
Dimensions	35 x 324 x 265mm
Weight	2.9kg
Ports	2 x USB 1.1, 2 x PC Card, 1 x i.LINK
Network	Realtek RTL8139 10/100 Ethernet
Modem	Conexant-Ambit SoftK56 Data Fax Modem
Battery	Lithium Ion
BatteryMark	2.19
Winstone	34
Contact	Sony
Phone	1300 137 669
Online	www.sony.com.au
Price	\$2,899
Verdict	●●●○



► **Solid gold:** The OpenBook 1846 is solidly built with the added bonus of impressive battery life.

The OpenBook's battery life at an impressive one hour and 43 minutes was also exceptional considering that the CPU hasn't been optimised for low power consumption. The issue of heat dissipation is addressed with small exhaust vents on the side and back, and a small fan that powers up when the CPU or GPU are under load.

The full size keyboard is a sheer pleasure to type on with ample travel for the keys and a smooth tactile feel. Annoyingly, there are no Home and End keys on the keyboard — they're accessed through chording the function keys with the Pg-up and Pg-down keys. The keyboard and left-biased trackpad are comfortable for a right hander to use, but southpaws may find it less than accommodating. Above the keyboard are five "Easy Launch Keys" with the remaining three being user programmable.

OPTIONS APLENTY

Included in our test configuration is a Sony DVD-ROM/CD-RW combo drive which delivers 8x DVD-ROM reading and 16x CD burning. As local AOpen distributor Bluechip Infotech offers the OpenBook 1846 as a build-to-order machine you can specify a different optical/removable drive along with pepping up the hard disk capacity and RAM configuration, and even opting for a slower CPU. Connectivity options such as built-in 802.11b wireless LAN also appear on the tick-a-box list.

Legacy users will appreciate both the addition of a floppy drive and the slew of legacy ports (parallel, PS/2 and serial). Two USB 1.1 ports and a single IEEE 1394 port alongside two full-height PC Card slots enable a wide range of expansion options, although four USB ports wouldn't go astray considering that the OpenBook is designed to replace a desktop.

A 10/100 Realtek RTL8139 NIC shunts bits across the LAN, and a 56K Lucent soft-modem allows you to dial-up whilst on the road. Linux users may have to connect a "hardware" modem for the system to function correctly, as soft-modems often do not have the required driver support under Linux.

The 1,024 x 768 is a decidedly low native resolution for a 15in LCD panel. A higher 1,280 x 1,024 pixel count would have suited more users, and made better use of the screen real estate. S-Video Out and VGA-Out ports allow you to connect to a TV/VCR or external monitor, respectively.

The SIS 7012 soundcard and speakers are sufficient for playing MP3s or the occasional DVD-ROM, but audiophiles should make use of the analogue Audio-Out port.

In a desktop business/commercial setting, relatively poor 3D performance isn't fatal, especially when you're carrying around the muscle of a 2.8GHz Pentium 4 workstation.

Dan Corkery

Desktop slayer?

Can notebooks ever truly replace desktop PCs? That's the question AOpen seeks to answer with its latest P4 screamer.

In the past APC has been disappointed by some notebooks powered by Pentium 4 desktop chips, but AOpen's desktop-slayer proves that with the right amount of effort and engineering the trade-offs (notably in battery life) can be minimised.

The OpenBook 1846 runs the 2.8GHz desktop Pentium 4 CPU, whereas the fastest Pentium 4-M CPU available to date is capped at 2GHz. The notebook's exceptional PC Mark CPU score of 6,419 reflects the desktop processor's raw number-crunching abilities.

Graphics performance from the SIS 650 chipset, on the other hand, is less than stellar in both 2D and 3D categories, scoring 1,130 3DMarks. Power users will find that the OpenBook isn't a capable graphics workstation, as its GPU and low-resolution screen aren't roomy or powerful enough for many applications. Software developers, gamers or graphic artists would do better with a more powerful graphics engine based on an ATI Radeon Mobility or NVIDIA GeForce2Go chipsets.

FUNCTION OVER FASHION

The 1846's look isn't outstanding, but neither is it ugly. It's best described as inoffensive: boxy with slightly rounded corners. The upper half of the notebook base spans from the palm-rest to the keyboard surround, and the display housing is finished in a smooth metallic-blue paint. Although the look is metal, the entire casing is very much plastic.

The bottom half of the OpenBook's case is moulded in a more conventional dark grey texture which is a contrast in both look and feel to the painted portion. Overall build quality is excellent, and an incredibly strong set of hinges holding the display panel along with a flex-free chassis reinforce this fact. The effect is one of function over fashion.

Details ►►

Processor	Pentium 4 2.8GHz
Memory	480MB
Hard Drive	40GB
Display	15in TFT
Video	32MB shared SIS M560
Operating System	Windows XP Pro
Dimensions (HWD)	48 x 325 x 277mm
Weight	3.2kg
Ports	PS/2, 2 x USB 2.0, Serial, Parallel, IEEE1394, Audio Out, Line-In, Headphones, VGA, Out, S-Video Out
Network	10/100 Realtek RTL8139
Modem	56K
Battery	Li Ion
Battery/Mark	1hr and 43mins
Winstone	44.5
3DMark 2001	1,133
Contact	Bluechip Infotech
Phone	(021) 8745 8437
Online	www.bluechipit.com.au
Price	\$4,499
Verdict	●●●●○

► **Cable-works:** Serial ATA data cables are narrower than conventional 40- or 80-pin flat ribbon cables.



Driving force

Serial ATA is here, so APC puts it to the test against ATA133 to discover if the new spec really does deliver.

Serial ATA has long been in planning and implementation. Motherboards fitted with Serial ATA connectors began appearing in the middle of 2002, but the drives themselves weren't available locally until December. So APC has scored our first hands-on lab session with Seagate Technology's 120GB Barracuda Serial ATA drive (ATA V ST3120023AS).

The first iteration of Serial ATA pushes the theoretical transfer rate from 133MB/s to 150MB/s, with the goal of reaching 600MB/s in 2007.

Externally, the main differences between serial and parallel ATA drives are the power and data connectors. Serial ATA data cables are much narrower than the conventional 40-pin or 80-pin flat ribbon cables, without per-pin addressing, and terminate in a thin connector. These cables can be up to a metre long, compared to the 18in limit of ribbon cables, so box builders can put more distance inside the chassis between connectors and drives.

Signal integrity in the new cables is stronger than the ribbon cables, which were prone to crosstalk and other degradations, and the narrow cable width also positively aids air flow inside the case. The drive's power requirements are reduced from 5v to 3v.

INTEGRATING INTO YOUR SYSTEM

The main challenge for those looking to move to Serial ATA will be integrating the drive into their system, even given motherboard support. APC attempted to install the Barracuda Serial ATA V drive into a testbench consisting of a Leadtek WinFast K7NCR18D-Pro motherboard fitted with an Athlon XP 2600+ CPU and 256MB of PC133 DDR SDRAM; the Serial ATA interface was provided by an SLIG Serial ATA PCI card (selling for around \$50 in stores) with a Silicon Image chipset.

The first problem was that Windows XP Professional refused to install onto the Barracuda. It couldn't identify the drive without our manual intervention and advising Windows Setup that a third party SCSI or RAID driver was required. Once this was loaded the installation proceeded until Windows started to format the drive, at which point the install routine would hang.

We tried to partition and format the drive with a Windows 98 boot disk, but the same mid-format crash occurred after we upgraded to Windows XP and tried converting from FAT32 to the NTFS file system. The trick was to download and create a boot floppy of DiscWizard (a utility found on the Seagate site) which partitioned and formatted and allowed the Windows installation to complete.

A pair of the Barracuda drives were installed to test Serial ATA under RAID, using MSI's KT4 Ultra mobo with a Promise PDC 20376 Serial ATA RAID controller. After setting the controller to stripe the two drives and loading the driver during the install, the format ran to completion and after install effectively provided the system a single 240GB RAID 0 array.

The results of APC's tests on this product indicate that while you won't notice any difference in performance over small reads or writes, there's a substantial boost when working with larger files or blocks of data (with the striped pair of drives showing Serial ATA in the best light).

If you're upgrading or increasing your hard disk storage, you should consider Serial ATA. Nevertheless, the first wave of drives will command a 10-15% premium over a conventional drive of the same capacity.

David Lin

Details ►►

Contact Seagate Australia

Phone [02] 8748 2700

Online www.seagate.com

Price \$389

Verdict ●●●●○

	DiskBench		WinBench			Sandra							
	128K byte write (MB/s)	Business Disk WinMark	High-End Disk WinMark	Disk Access Time (ms)	Disk CPU Utilization	Drive Index	Buffered Read (MB/s)	Sequential Read (MB/s)	Random Read (MB/s)	Buffered Write (MB/s)	Sequential Write (MB/s)	Random Write (MB/s)	Average Access Time (ms)
Leadtek with Maxtor Okamond Max 16 ATA133	9,906	7,130	17,700	25.4	61.4%	21,008	99	31	4	68	31	8	12
Leadtek with Seagate Barracuda Serial ATA V	14,596	11,540	17,600	11.4	7.9%	45,115	88	37	6	68	35	9	8
MSI with Seagate Barracuda Serial ATA V in RAID	34,061	9,070	19,800	13.8	75.1%	38,284	82	57	6	73	58	11	9

Multiple drives are best: while some benchmark results show no favour to a Serial ATA solution, the outstanding advantage lies in a RAID configuration for multiple drives.



Transparent motives

This latest SOHO scanner from Canon not only scans film and transparencies, it does so with style, ease and quality. Just be prepared to wait for the results.

Designed for the home or small office, the CanoScan 8000F is a plug-and-play USB 2.0 scanner. The software bundle loaded flawlessly under Windows XP, though tighter integration between the various applications during installation would have made it even easier. We had to sit through the setup package clicking OK as each of the individual software components loaded under the control of the Canon installer software.

The CanoScan 8000F supports the new USB 2.0 standard which allows for theoretical data transfer of up to 480MB/s, provided your computer has USB 2.0 ports or an add-on card such as the Adaptec Duo Connect which we used for testing.

Although any add-on card should work, Canon has only verified compatibility with Adaptec cards. If you don't have a USB 2.0 or are using an older PC or Mac, learn to be patient as the USB 1.1 12MB/s maximum transfer rate makes scanning high-res images a tedious process.

SLOW FILM SCANNING TIMES

Despite the faster USB 2.0 support, film scanning is tedious — it took the CanoScan over five minutes to recognise, scan and crop a negative. In one of our tests, the automatic scan mode failed to detect that the film was a negative rather than a transparency and couldn't separate the individual frames.

► **Stylish and versatile:** the aluminium-framed CanoScan is ideal for SOHO applications. It also comes with a top software bundle.

Manual scanning of the negative was fine, particularly if you use the advanced settings and multiscan (which scans and automatically crops multiple negatives in one scanning pass) to control the resolution of the scanned images and enable automatic cropping of the individual frames. Patience is again required as it can take around eight and a half minutes (ten minutes with USB 1.1) for the scan and cropping to complete.

Provided your machine adequately runs 2000 or XP, you shouldn't have any problems with the software bundle since the recommended configuration is a Pentium III processor with 128MB of RAM. Admittedly, if you're scanning high resolution images or film, the more RAM the better since images at the full 2,400 x 4,800dpi resolution can be around 320MB in size and take several minutes to transfer.

One of the things we liked most about the CanoScan 8000F is that the film and transparency adaptor is built into the lid, making it easy to scan films and slides without having to fiddle around with an external adaptor (like the HP ScanJet 4570C). The CanoScan can also scan up to 12 film images at a time, with the software automatically cropping and separating the images.

Another thing we liked is that the CanoScan is fully automatic and can be controlled either from the computer using the CanoScan toolbox or from buttons on the scanner. The scanner and software automatically detects what is being scanned (photo, transparency or negative), adjusts the scanner driver and automatically crops the image.

If you have a current model Canon BubbleJet printer, the software can send the image directly to the printer as it's scanning, saving some time particularly with larger high-res images. This is just as well since the CanoScan takes 66 seconds (and 78 seconds on a USB 1.1 connection) to recognise and scan a 6 x 4in colour photo at 300dpi.

VIBRANT IMAGES

Scanned photos and film display excellent contrast, fine detail and good colour accuracy, particularly when enabling the FARE dust and scratch removing algorithms. On a calibrated NEC monitor, we found colours to be slightly oversaturated, vivid and reddish compared to the original image but still vibrant and life-like.

Compared to a similarly priced HP scanner, the Canon produced a visually better photo image as the HP image was too bright and lacking in contrast. There was almost no competition between the sharp colourful scans of negatives produced by the Canon compared to the dull grainy images produced by the HP. Although much slower than the HP — which produced scans in around 30 seconds even under USB 1.1 — the Canon images are definitely worth the wait.

The supplied software bundle has everything a SOHO user needs to produce artwork, email photos and store images in photo galleries. The software is easy to use and includes the older version 1.01 of Photoshop Elements as well as useful built-in functionality such as red eye removal and OCR for scanning text documents.

David Neiger

Details ►►

Contact: Canon Australia
Phone: 1800 816 001
Online: www.canon.com.au
Price: \$599
Verdict: ●●●●●



► **Stable:** Lindows uses KDE 3.0.1 to deliver an OS that caters to PC appliances.

met with an error message stating that the password had to be changed (and it reverted back to the root account). APC had the same problem even after logging in as root and changing the password, so we eventually entered console mode and tried from there. Once again, the same problem surfaced, yet this time it was possible to enter another password directly. This was finally accepted when the computer was rebooted.

After you finally get into the distribution (using an account other than root), the first thing that grabs you is how feature-poor Lindows is! It becomes immediately obvious why the installation only took 15 minutes — you are given a rudimentary collection of packages, but little else. Netscape 7.0 is there, along with Kwrite, Kate, KreateCD and a few games, but the absence of OpenOffice.org is noticeable.

CLICK-N-RUN

If you want to install additional applications on top of Lindows, you have to use Lindows' own Click-N-Run application to connect to an online software repository and download software. In general, most KDE 3.0 applications will work without a problem, and many have been made available for free download.

Some Gnome applications are offered under CnR, like Evolution, but the jewel of the service is Sun's StarOffice 6.0, which usually retails for US\$75. The Click-N-Run application still needs some work but is functional enough for most users. Okay, there were also some problems when installing StarOffice. As Lindows is built on a Linux base, you have to install each application while logged in as root. When you install the StarOffice suite, it is only accessible by the root account. You have to manually go back and change the permissions, which is a severe pain.

One of Lindows' weaknesses is its driver support, and it's an area that could hurt Lindows' long-term viability outside the "Appliance PC" market space. If Lindows is only going to be sold on machines in department stores or shopping centres, the manufacturer has total control of the hardware, and can therefore carefully select components that are supported natively.

Chains like Walmart can even work with the Lindows developers to ensure that adequate drivers are matched to hardware components. Unfortunately Lindows is also offered as a stand-alone operating system, and the developers have no control over which components you have in your PC. Even large, well-supported operating systems like Windows XP still have the occasional driver anomaly, so for Lindows to support every component ever made is a big ask.

Lindows doesn't have the customisability of most Linux distros, but that's not what most home users want. They want a machine that can be simply plugged in, turned on and used. In this regard, Lindows succeeds. Unfortunately, troubleshooting some problems will require more knowledge and experience than the target user will have.

Matt Overington

Half baked

The idea of an OS for home "appliance" PCs is sound, but is there enough in Lindows to make it in the real world?

In the APC October 2002, there were reviews of some Linux-based Windows killers (page 82). In addition to OEOne HomeBase and Lycoris Desktop/LX, one of the best-known simplified Linux distros is Lindows, which has just hit its third release. Already it's being offered in sub-US\$230 systems from discount department store Walmart in the US.

Lindows retails for US\$129, and is supplied on a single bootable CD-ROM. The installer is as straightforward as can be expected, rivaling Lycoris for ease of use. The only real choice to make is whether to maintain your existing partition configuration, or just let Lindows use your entire drive. It also includes its own boot manager, which scans your drive for existing bootable operating systems.

Unfortunately you don't have any choice regarding whether or not this is written to the Master Boot Record, so if you'd rather use an alternate boot manager, you'll have to reconfigure it.

MODERN COMPONENTS

Lindows sets up the journaling file system, ReiserFS, as the default file system, and it takes about 15 minutes to copy the packages to the hard disk before it boots for the first time. Like most Linux distros, you're given the option of booting in graphical mode or safe/expert mode. Behind the scenes, Lindows is based on Debian (running kernel 2.4.19), with Xandros providing some additional code. Lindows has chosen one of the most solid Linux distros as a foundation, and has added KDE 3.0.1 and XFree86 4.2.0. This combination renders Lindows exceptionally stable and robust (APC didn't have a single crash in several weeks of testing).

Unfortunately, after booting we encountered the first of several problems. Logging in as root, we set about creating a new user account. After logging out and trying to log back in using the new account, we were

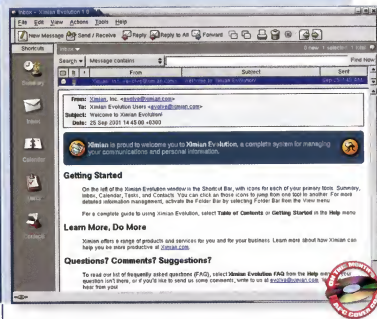
Details

Contact Lindows

Online www.lindows.com

Price US\$129

Verdict ●●●○



► **Look familiar?** Ximian Evolution closely mimics Microsoft Outlook.

EASY CONFIG

The most noticeable improvement is in the configuration system. In previous versions, settings for mail accounts, calendars and fonts were all under different menus, so that configuring Evolution for personal preferences was an arduous task. In 1.2 a single, centralised configuration menu removes most of the pain of setting up email accounts, folder settings, calendar, fonts and directory services.

Evolution also provides email and text-composition goodies such as spell-checking, auto-formatting and automatic address completion. You can globally specify folders for auto-completion, and you can even run category searches under LDAP (the Lightweight Directory Access Protocol).

As good as Evolution is, the biggest drawback is its ability to connect to a Microsoft Exchange 2000 server via Ximian Connector. Evolution can be used in conjunction with Exchange 2000 to deliver shared calendars, task lists, contacts and personal email. It means that you can easily incorporate Linux machines into a Microsoft network with no loss of productivity.

Evolutionary step forward

The latest version of this leading Linux mail client is easier than ever to use and configure.

Linux users may brag about many aspects of their chosen OS, from inherent robustness and extensive up-time to low or non-existent licensing costs, but they can't escape the "application envy" that comes from the wealth of great software available for Windows.

Yet programs like Ximian Evolution are starting to change that. Bundled with most modern Linux distros, Evolution is an email, contact, task and calendar application for Linux which mimics Microsoft Outlook — and, with Ximian's Connector for Exchange commercial plug-in, Evolution can connect to an Exchange 2000 server for full groupware functionality.

GO DOWN THE RED CARPET

The most common way to obtain Ximian Evolution is through Ximian's Red Carpet download manager. Red Carpet consists of a client-side application that runs on your Linux machine to handle downloading and installing software. Red Carpet provides the easiest installation path for many of Ximian's products (including GNOME 2.0).

You can also pay a subscription fee for the Red Carpet service, which gives you access to many commercial applications like Star Office. The Red Carpet Interface is somewhat similar to the Windows Update feature found in later Microsoft operating systems, and keeps you informed whenever your installed applications can be updated.

Check out this month's cover CD for Red Carpet, which can be used to download Evolution.

Matt Overington

Details ►►

Contact Ximian
Online www.ximian.com
Price Free (Ximian Connector, US\$69)
Verdict ●●●●●

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- Compatible with IEEE 802.11b (DSSS) 2.4 GHz Standard. Up to 20% better transfer
- 22Mbps with other AirPlus devices
- 64/128/256 Bit WEP Security
- Built-in Diversity antenna or External antenna support
- Drivers: Windows 98, 2000 & ME



\$199
RRP incl GST

Wireless PCI Adapter

- Compatible with IEEE 802.11b (DSSS) 2.4 GHz Standard
- Up to 20% better transfer with 802.11b
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- 64/128/256 Bit WEP Security
- Drivers: Windows 98, 2000, ME, XP & NT
- Upgradable antenna

Indoor/Outdoor Bridges



- 11Mbps Wireless
- 128 Bit WEP Security
- Ethernet to Wireless LAN Multipoint Bridge
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- Detachable Antenna enables extended range up to 5.5km's
- Built-in Power Over Ethernet Feature

\$822
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- 64 Bit WEP Security
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\$4,948
RRP incl GST

DWL-1800B

Wireless LAN Outdoor Bridge Long Range

\$4,194
RRP incl GST

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- Ethernet to Wireless LAN Multipoint Bridge or Access Point
- 22Mbps with other AirPlus devices
- 64/128/256 Bit WEP Security
- Configuration & Management via Web Browser, Built-in DHCP Server
- Providing Load Balancing and Backup Link features

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Enterprise Wireless Access Point/Bridge

Wireless Antennas



- 80° Horizontal & 80° Vertical Spread
- Extends Wireless Range up to 0.5 km
- Connector: RP-SMA
- Suitable for DWL-1500, DL-713P, DWL-520+ & DWL-900AP+

\$129
RRP incl GST

DWL-M60AT

Indoor 6 dBi Indoor Directional Patch Antenna



- 70° Horizontal & 70° Vertical Spread
- Extends Wireless Range up to 1 km
- Connector: N-Female
- Supply 3m Patch Cable with N-Male to RP-SMA
- Mounting Kit Supplied
- Suitable for DWL-1500, DL-713P, DWL-900AP+ and DWL-1000AP+

\$325
RRP incl GST

ANT24-0801

8.5 dBi Indoor/Outdoor Pico Cell Patch Antenna



- 15° Horizontal & 15° Vertical Spread
- Extends Wireless Range up to 5.5 km
- Connector: N-Female
- Supply 0.5m Pigtail Cable with N-Male to RP-SMA
- Mounting Kit Supplied
- Suitable for DWL-1500 and DWL-1000AP+

\$650
RRP incl GST

ANT24-1801

18 dBi Outdoor Directional Yagi Antenna

54/22/11MBPS DUALBAND WIRELESS

AirPro



11/54Mbps Dualband Wireless PCI Adapter

- IEEE 802.11a (5GHz) and IEEE 802.11b (2.4 GHz) Standard
- 72 Mbps Turbo Mode IEEE 802.11a
- Autosenses and adjusts speed to conditions for max performance
- 64/128/152 Bit WEP Security



11/54Mbps Dualband Wireless PCMCIA Adapter

- IEEE 802.11a (5GHz) and IEEE 802.11b (2.4 GHz) Standard
- 72 Mbps Turbo Mode IEEE 802.11a
- Autosenses and adjusts speed to conditions for max performance
- 64/128/152 Bit WEP Security



11/22/54Mbps Dualband Wireless Access Point

- Compliant with IEEE 802.11a (5GHz) and IEEE 802.11b (2.4 GHz) Standard
- 10/100Mbps Fast Ethernet port for connecting to Wired Network
- Autosenses and adjusts speed to conditions for max performance
- 64/128/152/256 Bit WEP Security

Wireless IP Routers



- Cable/DSL modem Internet Sharing
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- Integrated 22Mbps Wireless Access Point
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\$590

R.R.P. incl. GST

DI-614+

Cable/DSL Router with 4-port Switch

Others



- 11Mbps Wireless
- Built in Web Server for GUI remote access
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DCS-1000W
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- 11Mbps Wireless
- 3-Port 10/100Mbps Switch and 1-Port Print Server
- 10Mbps WAN Port for DSL/Cable Modem
- RS232 Serial Port for Analog Modem
- NAT for single IP Address and Firewall Protection
- DHCP, VPN, PPP, PAP/CHAP Security

\$590

R.R.P. incl. GST

DI-713P

IP Router for DSL / Cable modem with Switch & Print Server



- Fully compliant with Bluetooth 1.1 Standard
- 723Kbps Data Rate, 10-20Mtr Range
- Plug and Play USB interface with host PC
- Powered by USB Port
- Supports WIN 98, 2000, ME and XP

\$125

R.R.P. incl. GST

DBT-120

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► **Affordable:** the new Bluetooth hub is similar in price to mid-range Wi-Fi hubs.



Bluetooth revisited

Don't hang up your cables just yet — the new

BLUETAKE X-Bridge still has some issues to sort out.

APC's first Bluetooth networking experiment in August 2002 was a thorny encounter with this promising, yet complex, wireless technology. In the end, it was almost relief to go back to cable.

Six months later, more mobiles, handhelds and peripherals now come with Bluetooth built-in and there is a wider choice of Bluetooth USB adaptors and cards to fit your existing PC and notebook. These devices largely use the technology to replace infra-red or USB cables in one-to-one connections.

Yet if Bluetooth can overcome configuration issues, it's also flexible and powerful enough to network on a one-to-many basis. The vision of a Bluetooth Personal Area Network (PAN) is to create an open, universal communications environment where you can not only connect any two Bluetooth devices, you can also instantly access any existing network using a Bluetooth access point.

A Bluetooth Access Point is the most powerful Bluetooth device available. The Class I antenna has a 100m range and consumes more power than Class II and III antennae found in energy-efficient handhelds. While early hubs sold for \$1,500, the BLUETAKE X-Bridge Bluetooth Access Point now makes Bluetooth networking similar in price to mid-range Wi-Fi hubs.

A Bluetooth Access Point functions as an extension to an existing cabled LAN. It plugs straight into your broadband modem or router and provides Net access to any Bluetooth device in range.

However with a maximum transfer rate of 1MB/s, Bluetooth is no substitute for Wi-Fi (especially for Net access over a 512MB/s ADSL connection).

PAN HANDLING

We connected the Access Point to a spare Ethernet LAN port and set up a Bluetooth PAN consisting of two Nokia mobiles, a Palm m505 with Bluetooth adaptor, a notebook and Apple G4 with a BLUETAKE USB adaptor and the HP Deskjet 450 printer with a Bluetooth card (the first Bluetooth printer in Australia).

To configure the Access Point, you need a Bluetooth adaptor capable of remotely managing a Bluetooth LAN (the hub comes with very little documentation and no software CD). We installed the BLUETAKE USB dongle (\$169) on a nearby Windows XP desktop.

Every Bluetooth chip has a unique address that can be detected (and detect) any other Bluetooth device.

After searching and selecting your target device, choose a connection "profile" (such as file transfer, LAN or dialup access) and establish a link. If security is activated, the other device will demand a passkey (trusted devices can usually sense, select and connect). The Bluetooth Access Point takes this one step further by acting as a wireless bridge to the Internet. Bluetooth communication protocols are based on a set of universal open standards, yet the connection software is different across devices. For example, the BLUETAKE USB dongle uses a Windows-like interface called "My Bluetooth Places", while the Palm OS is poles apart from the Pocket PC. Connection is expected to become more consistent now that Microsoft has included Bluetooth support and development frameworks in Windows XP Service Pack 1.

There are two layers to a basic Bluetooth network connection in Windows XP; the connection managed by the Bluetooth software and the active Internet connection monitored in the Windows "Network Connections" control panel.

SECURITY

Bluetooth security has been praised over Wi-Fi for its automatic encryption and authentication protocols. Unfortunately, it is human factors that expose weaknesses in the technology. While you can set a password for LAN access, it can also be left blank for public access (if you forget the password, a button on the base of the hub resets the device, blocking all login attempts other than the dongle). The hazards of not accurately naming each Bluetooth device and repeating the same passkey emerged when one attempt to send a business card accidentally printed a VCF file on the HP Deskjet.

In the end, the quality of your connection depends on the device that initiates the request. The Access Point supports seven simultaneous connections, but signal strength varies depending on the physical barriers, environment and the device connecting (the Access Point had a maximum 35m range in APC's offices).

An Access Point may be worthwhile for a group of skilled, risk-tolerant and persistent handheld users who want Net access without syncing with their PC. But at this stage, Bluetooth networking remains strictly for the adventurous.

Fiona Angus

Details ►

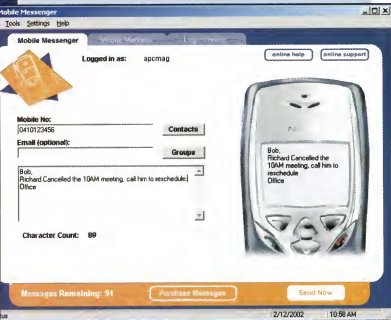
Contact MicroGram Computers

Phone 021 4387 8444

Online www.mgram.com.au

Price \$369

Verdict ●●●●○



► **Convenient:** serious SMS users, especially business, will appreciate the Outlook integration and simple user interface.

Messenger and Marketer both support "Reply" or Two-Way Messaging. You can configure Mobile Messenger to list a mobile or land-line phone number as the reply-to field or, for \$45-\$60 per month, a "virtual" mobile number which will forward all replies to an email account. Use either the ultra-simple, standalone application or integrate Messenger into Outlook (all versions through to 2002).

In Outlook, a "Send SMS" icon appears in the toolbar. Messages can be sent to your Outlook contacts. In standalone mode, Messenger stores a copy of every message sent in a text file, while the Outlook version leaves a copy in Outlook's Sent Items folder.

On installation, we were greeted by an unhelpful error message "Error code: 100". Fixing firewall settings fixed the problem, but neither the error message nor the online documentation explained what the error code meant.

100 SMS messages and a licence for up to 10 users are included in the price. Messages are purchased in blocks and billed on delivery, with the first 100 messages charged at 22c each. 500 blocks reduce the rate to 20c. No time limits are imposed on message use.

The Marketer application is dedicated to sending batches of SMS messages. Contact lists are imported using CSV files, and a merge function allows limited personalisation of messages. Sales and marketing staff gain another method of winning business.

Logo Creator (also available separately for \$39) creates operator logos using simple drawing tools or by importing a monochrome bitmap. However this application isn't too useful and isn't even marked on the box. There is no support for EMS (Enhanced Messaging Service) and MMS (Multimedia Messaging Service), nor scheduled sending of reminders, so you're limited to standard SMS messages of 160 characters. Version 2.0 of the application (due in the first quarter of 2003) promises to add this functionality.

SMS is a useful tool, but whether or not it's worth \$149 is another matter altogether. Serious SMS users may appreciate the Outlook integration and simple UI, but if you are just dipping your toe in the SMS pond, consider instead trialing one of the online services first.

Don Corkery

Details ►►

Contact Data Marketing Services
Phone 1300 888 386
Online www.mobilemessenger.com.au
Price \$149
Verdict ●●●●○

Get shorty

When Short Message Service meets Outlook, it's the best of both worlds.

SMS is great for quick, personal messages, but businesses can also use it to communicate directly with staff and clients, providing important information instantly. Staff can instantly relay messages, confirm/cancel appointments, and contact employees in environments where a phone call is inappropriate (such as a meeting).

Mobile Messenger is tailored for such an environment, and is a Java-based Windows application that connects your PC to the messaging functions of the worldwide GSM mobile phone network. It has three parts: Messenger, Marketer and Logo Creator, and is aimed at business users. Several domestic and overseas Web sites offer consumer SMS messaging functions (www.blueskyfrog.com for instance), at equivalent prices.



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Shooting star

Can Canon's new flagship compact digital camera keep up with its five megapixel competitors?



The G3 sits proudly as the new flagship of Canon's PowerShot digital camera range in the compact market segment — compact in this sense that it's not a member of the EOS Digital SLR series.

Its predecessor, the G2, is highly regarded as the digital camera of choice among enthusiasts for its impressive combination of features, quality and value, while continuing to hold its own against new competition.

THE GREAT LEAP FORWARD

Though Canon continues to sell the G2 alongside the new G3, the G3's upgraded specs and extra \$100 price tag indicates that the crown has been passed on. One aspect that does remain the same, however, is the four megapixel CCD, despite competitors such as Sony and Nikon having five megapixel models on offer. What this translates to is that the Canon has less image resolution — topping out at 2,272 x 1,704 pixels versus 2,560 x 1,920 of the five megapixel cameras.

Just about every other function in the G3, however, represents a significant overhaul of the outgoing model. For a start, its lens now features a 4x optical zoom (35–140mm equivalent) over the 3x (34–102mm equivalent) of the G2. Though the digital zoom multiplier remains at 3.6x, the extended optical range now gives a combined zoom of 14x. The lens also features a new bayonet-type connector for add-on adaptors and accessories once the lens barrel cover is removed.

We have one gripe here. Where the optical viewfinder in the G2 was centred directly above the lens barrel, it's offset to the right in the G3, and its already small representation of what the lens sees is partially obscured by the barrel cover. Thankfully, the excellent flip-out, 270-degree rotating LCD viewfinder has been carried over from the G2 which offers great all-round visibility, even in strong sunlight.

► **Zoomin':** the G3 has whopping combined zoom of 14x and a 4x digital zoom (35–140mm).



The camera body has also been tastefully restyled, giving it a more robust and professional look and feel.

FULL CONTROL

Initially, the G3 appears to be a more intimidating camera to use, with more dials and buttons to operate. Novices may find the control layout confusing because of the

new toggle-style switch for powering the camera on, and switching between record and playback modes. Along with a button for selecting between continuous shooting and timer/remote functions, there are now five separate dials, buttons and switches on the top-right side of the camera. The back panel retains almost the same layout as the G2 save for a manual focus button.

Various shooting modes can be quickly accessed via a dial which includes a number of presets for different lighting and composition styles, such as Night Scene, Portrait and Stitch Assist (for panorama shots). The G3 now accommodates two custom slots where you can save frequently used settings from Program, Shutter priority (Tv), Aperture priority (Av) and Manual (M) modes. Switch to the Tv, Av or M settings and the G3 starts to feel like an SLR in operation. The main dial sits conveniently under your right index finger and turns to adjust shutter speeds and aperture.

Selecting manual focus enlarges the centre area of the viewfinder screen to help you get the right sharpness on a subject. A vertical indicator bar on the side shows the focus distance. Again, the main dial jumps into action for this function. The camera switches back to record mode from play when it senses that the shutter button has been pressed — a nice touch.

SHUTTERBUG

A new technology that Canon is introducing with the G3 (and the S45 and V3 models) is a "processing engine" called Digital Imaging Integrated Circuit (DIGIC). DIGIC combines the functions of key elements such as CCD sensor control, auto exposure, image signal processing and JPEG compression into a single processor to help improve the quality of recorded images and camera response times.

Although the continuous shooting rate of a claimed 1.5 to 2.5fps is the same as the G2, the G3's capacity has been improved. Our tests at maximum resolution and superfine quality settings managed nine shots before the buffer filled up, and simply turning the quality down a notch to fine increased it to 16. At its lowest recording resolution of 640 x 480, the G3 rattled off 43 continuous shots before stalling to let the buffer catch up. However, with indoor lighting conditions it could only manage around 1.3fps. The G3's startup time of around 3.8 seconds is a little excessive.

The PowerShot G3 is the new king of compacts and thoroughly deserves the throne previously occupied by the G2. It will keep most enthusiasts happy with its wide range of controls, functions and features and has the image quality to match.

Simon Tsang

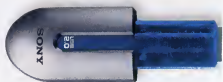
Details ►►

Contact Canon Australia
Phone 1800 816 001
Online www.canon.com.au
Price \$1,799
Verdict **★★★★**



The Sony Micro Vault
transfers data
from one computer

SONY



to another, easily.

Small, sleek and powerful, the ANOS is a USB drive that lets you transfer data from one device to another, easily. It's a small, sleek device that lets you transfer data from one device to another, easily. It's a small, sleek device that lets you transfer data from one device to another, easily.

MICRO
VAULT.

Joke no more?

This major improvement on earlier editions is set to silence FrontPage's critics.

For some years FrontPage has been the target of numerous jokes in the Web development community. Seen as the Web page editor for the casual designer who doesn't need to know a lot about HTML, Microsoft is seeking to change the Web public's perceptions.

With a swag of new features, some similar to competing products such as Dreamweaver, FrontPage 11 (due mid-year as part of the "Office 11" suite) looks set to raise a few eyebrows. It raised ours when it informed us that SP3 is required for a Windows 2000 install. Thankfully it doesn't require SP1 for an XP installation.

If you've used FrontPage before you will be

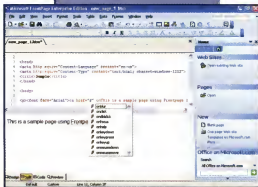
familiar with the WYSIWYG and HTML frames. FrontPage has now incorporated the split-pane feature that lets you see your code in an

upper window and WYSIWYG view in the lower window. It has a Quick Tag Toolbar and Quick Tag Editor. The QT toolbar lets you select and edit items and tags in your documents. Microsoft has added "Code Intellisense" which displays the parameters available for your code and includes statement completion. You can also store "code snippets" that you can quickly insert into your pages.

You can optimise your pages for a particular browser or at a particular resolution. Flash content can be inserted with ease thanks to drag and drop support. And a welcome surprise was the addition of grid lines and multiple rulers for page design and layout, something any Web designer can't live without.

Creating data driven sites has traditionally involved hand coding, and FrontPage 11 now has the capability to step the user through the process of connecting to a data source such as an XML tree or a SQL Server database. With a few clicks of the mouse you can have active content in your ASP or ASP.NET pages. Perfect for the novice user.

Paul Robinson



Easy to use: the Quick Tag Editor allows you to select tags and parameters on-the-fly.

Details ▶▶

Contact Microsoft
Phone 13 20 58
Online www.microsoft.com.au
Price TBA
Verdict ●●●●○

AlphaSmart Dana

(Almost) great Dana

Not a Palm, not a notebook — Dana fills a niche for users wanting a basic computer on the go.

While AlphaSmart's Dana is a long way from offering the power or flexibility of a laptop, this slim subnote running the handheld PalmOS has the potential to carve its own space in the market.

Weighing just under a kilogram, the Dana is roughly the size of a closed notebook. Its curve-moulded form factor and elongated screen are aimed at functionality, not flamboyance. At the back lurks memory card slots — SD/MMC, USB connectors for PC and printer, and an infrared port.

Having a laptop-sized keyboard totally changes the dynamic of Palm OS. It's easy to navigate via directional keys and a handy top row of function

and shortcut keys, so you use the stylus very little. The resistive touchscreen is in wide-format 560 x 160 pixel resolution which

the built-in applications make full use of, and can be oriented either horizontally or vertically. Fully charged, the unit will run close to 30 hours.

The Dana is fully compatible with the Palm application library. The packaged word processor, AlphaWord, outputs text in rich text (RTF) format, which makes printing or porting your work to the likes of Microsoft Word or AppleWorks a breeze. When viewing your work, you have the option of rotating the screen output sideways, but sadly, not upside down, which would have been useful for mini presentations or team-based efforts.

While targeted at students, the Dana is just as likely to appeal to pragmatic souls who don't need a laptop to execute the most basic applications on the go. If you've longed for Palm-style applications in a laptop form factor, you'll find this a compelling package but for one glaring issue: the price tag. Given that \$1000 buys a cheap desktop PC or a used, older notebook, paying that amount for what is ultimately a "widescreen Palm with a keyboard" seems excessive.

Justin Kranzi

Different: the Dana is a low cost, handy alternative to a laptop.

Details ▶▶

Contact Bright Spark
Phone (03) 9802 1855
Online www.brightspark.net.au
Price \$995
Verdict ●●●●○



Tripping out

A CompactFlash card reader means this portable hard drive stands out from the crowd.

The Tripper is a USB 2.0 external hard disk storage with a difference. In addition to the usual 20GB 2.5in hard drive found in most external drives, it also features a built-in CompactFlash card reader with enough headroom to support both Type I and II CF media. Once inserted, data from a CF card, such as images and MP3 files, can be transferred directly to the hard disk without the intervention of a PC. This makes the Tripper more of a storage companion than just another portable drive. Instead of carrying an entire notebook PC around on a trip to transfer your digital images to, you can bring the Tripper and dump your photos directly to the drive.

Design-wise, the Tripper is a box that, despite its metallic-looking silver finish, is made of thin plastic. The back cover flexes enough to make the device on the whole feel fragile and hollow.

Installation is straightforward, and apart from the drivers for Windows 9x/Me/XP/2000 supplied on a CD, there are no other software applications

provided. Just plug the drive into a spare USB 2.0 port and the Tripper is recognised as simply another drive in the OS. If a CF card is present, it will also be mounted as a removable drive in Windows, so files can be read directly from the Flash memory. Unfortunately, the Tripper isn't host-powered so it requires its external AC adaptor for recharging the removable Li Ion pack.

There are various modes for transferring data to and from the CF card. "Quick Backup" lets you copy all the contents of the CF card automatically without any intervention. It creates and names the folders it backs up to based on the date, and preserves the directory structure of the contents of the card.

It's a shame the Tripper doesn't include a built-in MP3 player which would make it one of the most complete digital storage companions on the market, and pit it against Apple's iPod. As it stands, the only thing setting it apart from a portable hard drive is the CF reader.

Simon Tsang



► Carry me: the Tripper is ideal for storing digital images and MP3 files.

Details ►►

Contact Mega Electronics
Phone (03) 9764 8903
Online N/A
Price \$599
Verdict ●●●●

Microsoft Wireless Optical Desktop

Cut the cables

Microsoft's first foray into the "cordless desktop" race is good but needs work.

Almost lost amid the cavalcade of keyboards and mice that Microsoft unleashed in the pre-Christmas season, the Wireless Optical Desktop sees the company stepping boldly into Logitech's turf.

Unlike the Bluetooth keyboard and mouse combo (reviewed in *APC* December 2002, page 50), the Wireless Optical Desktop relies on more conventional 27MHz radio signals beamed to its snazzy black-and-titanium components.

The revamped keyboard design includes a row of buttons along the top of the keyboard to open your documents, pictures and music folders; a "media control hub" for audio and video playback; plus hotkeys for your email, Web and instant

messaging. Function keys are sensibly angled towards the user, although their remapping to serve as shortcuts for Windows- and Office-related actions (such as New, Reply, Spell and Print) is of questionable advantage. The original function key roles are disabled by default, while the new Microsoft assignments are not standard among programs — for example, the keyboard tags F12 as Print, but in Word F12 activates the Save As command.

And lights to indicate the status of the function key lock, numlock and capslock have been moved to the wireless hockey puck transceiver that connects to the PC's USB port, which is of little use if you want to stow the controller out of sight.

The cordless optical mouse has precise tracking and a longer, sleeker feel than its predecessors. While the clear scroll wheel is a cosmetic touch, the mouse's shape is better for anyone with smaller hands than the average footballer.

David Flynn

Details ►►

Contact Microsoft Australia
Phone 13 20 58
Online www.microsoft.com.au
Price \$229.95
Verdict ●●●●



THE POSSIBILITIES ARE INFINITE

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Quick Touch Panel

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LifeBook C2210

LifeBook E7010

Wireless Corporate Firepower

LifeBook E7010

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Information is correct at time of printing



Adaptec XHub Series

If you're stepped up to USB 2.0 but find yourself running short of ports, or need them in a more convenient location than the back of your PC, take a look at Adaptec's new XHub series. The line-up starts with the XHub 7+ (shown right, which sells for \$219) that builds seven USB 2.0 ports into the back of a neat desktop photo stand. The metal stand also doubles as a cable manager. The XHub for Notebooks (pictured above, for \$39.95) provides compact connectivity on the road. An AC adaptor is provided for bus-powered peripheral support, although the hub also works as a self-powered device. Bear in mind that these are hubs, not adaptors, so you'll need USB 2.0 already fitted to your desktop or notebook before you can jump onboard this high-speed bus.

www.adaptec.com.au



Sony Cyber-shot DSCF77

This very cool looking digital still camera is the latest four megapixel compact from Sony. Unlike most cameras of this resolution or price range, the DSCF77 employs a fixed lens and relies on a technology called "Smart Zoom" for getting in tight on shots. It does this by using pixels on the CCD that aren't needed at lower resolutions. For example, shooting at the two megapixel setting gives you 1.4x zoom, and 1.2 megapixels offers 1.7x. This, Sony claims, is different to digital zoom where

you lose image resolution.

The swivel Carl Zeiss lens rotates 300 degrees, which comes in handy if you like shooting yourself a lot. Resizing and cropping an image in-camera is also possible. The DSCF77 sells for \$1,099.

www.sony.com.au



Hasbro R2-D2 Interactive Droid

This is a must-have for *Star Wars* fans — a real "live" R2-D2 droid for you to command. It features voice-recognition capabilities and sonar navigation so it doesn't bump into walls. It's even programmed with different moods to give it a bit more personality and makes all the right beeps and clicks of the real R2. It can also be trained to follow a predetermined path. Best of all, it comes with a cup holder.

While Hasbro told us that the \$249 R2-D2 is sold out in Australia, you may still be able purchase it online.

www.r2droidfactory.com



Nokia N-Gage

Nokia is about to add "game publisher" to its list of activities with the launch of the new N-Gage mobile game device. Designed with the GameBoy market in mind, the N-Gage represents Nokia's assertion that mobile gaming will become the biggest money spinner for telcos that are seeing rapidly diminishing returns on current voice and text messaging applications for mobile phones. The N-Gage is both a gaming platform and a GSM/GPRS mobile phone rolled into one device. It focuses on multiplayer gaming either through the GSM network, or the closer proximity of Bluetooth wireless. So far, Nokia has only announced Sega as a partner for the N-Gage, however several games are expected to be available at the product's launch.

www.nokia.com.au



THE POSSIBILITIES ARE INFINITE

FUJITSU

LifeBook P2120



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Tech Briefing

After FX nVidia gets cinematic

nVidia's sequel to the GeForce 4 is finally here, but will it add anything to your computing experience beyond faster 3D graphics? Justin Kranz investigates.

Engineers at nVidia have gone back to the drawing board with ex-3DFX employees and produced a card with image enhancement features that are just as important as the card's processing power. So what has been added, and how will it change your computing experience?

SMALLER WAFERS, BUT MORE HEAT

The new 0.13 micro process employed by Taiwan Semiconductor (TSMC) has seen the die size shrink by over 20% from the previous 0.15 micron process used in the GeForce4 Titanium and Radeon 9700 cards. TSMC estimates the performance boost to be 30%.

Memory hasn't been forgotten either. The 500MHz DDR2 RAM manages 1GHz throughput down the 128-bit bus, the total bandwidth a whopping 16GB. Good luck trying to exhaust that in today's apps.

The GPU runs at 500MHz, which regardless of die size requires an advanced heat dissipation solution. Hence the FX Flow Thermal management system. Intended for the top-of-the-line incarnations of the GeForce FX, and taking up slot space immediately under the card, the system of tubes, copper heat spreaders and fans is designed to sweep air in and over the components, and out of the case.

START YOUR ENGINES

Until the GeForce FX, if you wanted your nVidia card to make use of eye-candy technologies like full screen anti-aliasing (FSAA) and anisotropic filtering (which improves the clarity of textures), you sustained a sizeable performance hit. The GeForce FX's design allows use of such technology with minimal speed drop. The GeForce FX also supports up to 8X FSAA in both OpenGL and Direct3D, doubling the previous standard of 4X FSAA.

nVidia's adoption of 32-bit floating point colour processing for the GeForce FX also means that the oft touted "photo-realism in graphics" chestnut may actually be approaching the truth. While the statistics from video card manufacturers regarding the millions of colours generated onscreen by its products sound impressive, the reality is that the level of errors and artefacts present in these modes means a discernible difference is present between past offerings and the new GeForce's 128-bit colour.

The end result? The user gets higher levels of detail without frame rates being punished excessively.

THE REAL SLIM SHADER

Shaders alter a texture or model's appearance. A pixel shader alters the appearance of an object, a vertex shader alters the shape of an object. Hardware-supported shaders make deforming models and adding environmental detail like weathering, dust and fluid a lot less time consuming. Instead of requiring an artist and a lot of laborious work to reproduce an effect, programmers can write shader programs that will produce a mathematically correct execution of a given effect.

Although DirectX 9.0 supports pixel and vertex shaders, nVidia's shader support in the GeForce FX exceeds the API's specification by a considerable margin. Up to 32 128-bit floating point processors can be devoted to shader duties, which in turn means larger and more complex shader effects can be written and supported by the card.

And there's the rub. To get those avant-garde effects from the development studio to the user, nVidia is relying on enterprising programmers to carry the ball forward. And the tool they hope to be adopted by most developers is its high level programming language, Cg (C for Graphics).

C FOR GRAPHICS

Just like high level languages are used to simplify execution of a series of commands for CPUs, nVidia is hoping to make performance gains by having a language that addresses the GPU directly. Its transport to accomplish this feat is Cg. Developed in consultation with Microsoft, the language includes a toolkit that allows easy generation of sophisticated visual effects that would usually require the services of a skilled assembly programmer. The program works with older graphics cores as well as future ones, and caters to both OpenGL and DirectX.

The key difference between nVidia's approach with the GeForce FX and Matrox with its Parhelia is one of judgment. Not everyone will enjoy the benefits of three screen support on their Parhelia, but every GeForce FX owner will see the difference that 32-bit floating point colour makes. The main issue is that it's still early days for the language. Cg has heavy-hitters supporting it, and the card's more esoteric features are dependant on developer support.

Also, while on paper the GeForce FX holds the lead for now in the vertex shading speed stakes, it only takes a clock speed increase for rivals such as ATI's Radeon 9700 to be competitive. For potential users this means there is an element of being guinea pigs for nVidia's new initiatives, but this should not deter early adopters. Whether the GeForce FX follows nVidia's marketing hype as the "Dawn of Cinematic Computing" is likely left into the hands of skilled developers, but the tools and power on offer fulfil the hardware end of the bargain. **ETX**

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Mice to go

So, a notebook suits your mostly-mobile style,
but the pointer-stick or touchpad leaves you cold?

David Flynn checks out five road-friendly rodents.

Notebook PCs are becoming ever less of a compromise against their deskbound brethren, but one concession remains: how you move the pointer across the screen. The earliest portables made do with a clip-on trackball or forced you to include a desktop mouse with the other baggage of high-tech travel.

These days everything from whopping desktop replacements to tiny sub-notes has settled on one of two mouse replacements: a touchpad in front of the space bar, or some form of nubbin nestled between the keys. You can become expert at manipulating either of these pseudo-mouse technologies, but few would opt for these over the familiarity of a conventional mouse. That's where the notebook mouse steps in.

Small and lightweight, notebook or "travel" mice are equally at home on your office desktop, your dining room table or the writing desk at yet another hotel room. And even when space is at a premium, such as an aircraft tray table, many people find a small mouse preferable to a notebook's built-in pointing mechanism.

There's another reason to try a travel mouse: their diminutive size makes them ideal for kids, as well as grown-ups who have smaller-than-average paws. If you find the typical desktop mouse more akin to a house brick, a notebook mouse might be the answer.

MORE THAN MEETS THE EYE

Despite similarities in basic design, each of the five candidates in our road-friendly rat pack revealed that there's more to a notebook mouse than meets the eye, or the hand for that matter.

Each mouse used an infrared optical sensor instead of the out-of-fashion ball. The result is smoother tracking and none of the stop-start skipping caused by a build-up of dirt and grit on the sensor mechanism. Optical mice can be used sans mouse mat on any surface, be it transparent or highly reflective materials.

All five mice were ambidextrous, so they showed no favour towards right-handers nor treated southpaws like unwelcome visitors. They all sported the scroll wheel with a button beneath it, although none offered the additional side-mounted buttons that have become standard on larger desktop mice.

Another hallmark of the mobile mouse is that it eschews the long snaking tail of the desktop mouse, so you get less cable clutter. The cables of the mice tested ranged around from 70cm to 100cm (although the thin cables of the BenQ, Logitech and Microsoft models were prone to slight kinking and looping).

Finally, all of these mice use USB, making them ideal for plug and play, followed by a quick and painless unplug when you're done. However, if your notebook has only a single USB port you should add a compact USB hub to your travelling kit.



BenQ Mini Optical Mouse

This almost egg-shaped mouse is probably as small as a mouse could afford to be without becoming a novelty item. That alone endeared it to us, because travelling should always be about carrying less, not more.

However, while definitely being a winner for anyone with small hands (kids and adults alike), the more massive you might find the less comfortable you'll find the Mini Optical Mouse. To that extent it once again comes down to matching the person with the pointing device.

The BenQ scored points in several other areas.

Tracking was both accurate and smooth, and while exceptionally light, the mouse's weight is nicely centred for pleasing balance and feel, so it feels as if the mouse glides across the desk.

The buttons need only a soft touch, although they're a little noisy; the scroll wheel had the right amount of resistance, with solid detents along the way, however the centre button under the wheel requires a firm push to activate.

If you care for such things, it's nice that the Mini Optical Mouse comes in four colours (red, blue, green and yellow) with a matching underlit wheel which glows brightly in the same colour. And at \$25, the price is hard to beat. At that rate you could (and probably should) buy a second one to keep as a spare or to pack with your notebook's "grab and go" travel kit.



Details

Contact BenQ Australia
Phone (02) 9714 6800
Online www.benq.com.au
Price \$25



Kensington PocketMouse

While best known for its notebook security cable system, Kensington produces a wide range of desktop and notebook accessories — one of which is the PocketMouse, a close runner-up to the BenQ for the Editor's Choice.

The PocketMouse has a rounded almost bug-like shape and, while one of the largest in this Challenge, it has a pleasing feel in the hand, sits well under the palm and provides a relaxed and comfortable grip.

The mouse moves with positive traction, is nicely weighted and tracked well across most surfaces. Likewise, the buttons enjoy a good combination of touch, travel and resistance, while the rubber scroll wheel offered a nice degree of grip, although pressing the button under the wheel demands a firmly deliberate action.

Details ▶▶

Contact ACCO Australia
Phone (02) 9700 0180
Online www.accobrands.com.au
Price \$59
Verdict ●●●○

Belkin Optical MiniScroller

Almost the size of a small desktop mouse, the Optical MiniScroller is one solid critter. That's not good news if you want an ultra-small mouse, but it's an ideal go-between for use with your notebook when at the office and on the road.

The Optical MiniScroller's design starts low but is wide in the middle and has a steep camber to the rear, so while it's almost the same height as Microsoft's Optical Notebook Mouse, it looks bulkier. The mouse rises up into the cupped palm so the hand sits in a relaxed position. It's also quite robust, although it needs to be pushed a little more than the others.

Details ▶▶

Contact Belkin
Phone (02) 4372 8600
Online www.belkin.com/anz
Price \$50
Verdict ●●●○

Microsoft Notebook Optical Mouse

Given Microsoft's expertise with desktop mice we had high hopes for this mobile version. It however came up short.

The featherweight Notebook Optical Mouse is easily the lightest of the pack, but the plastic casing is so light that it feels fragile. And the weight distribution lacked any sense of 'centre', so it feels as if your hand is empty.

The tiny size makes this mouse a better bet for people with small hands, but we'd have some concerns about it withstanding hard knocks from kids.

The shape is more squared-off but still has a sculptured look, with the silver colouring offset by red side mouldings and wheel, which are gently lit when the mouse is moved.

The long buttons are sensitive and light to the touch and have sensible indentations for resting your fingers. The rippled surface of the scroll wheel has good traction but the clicks accompanying each detent are annoyingly loud. Traction was also curious, as it felt like the mouse was scraping on the surface of the desk.

Details ▶▶

Contact Microsoft Australia
Phone 13 20 58
Online www.microsoft.com.au
Price \$69
Verdict ●●○○

Logitech MouseMan Traveller

With its sharp lines, sleek profile and brushed metallic look, the eye-catching design of the MouseMan Traveller will make most notebooks seem dated. Toss in a 90cm extension USB cable and carry-bag and this is one slick package.

It runs slick, too: tracking is excellent and precise, the mouse is light, quick to the touch and well balanced.

But it loses points for impracticality. The buttons extend the length of the top deck and are integrated under the single-sheet cover, and as a result the MouseMan Traveller must be held differently to other mice. You can't cup your hand over the mouse. It lacks the familiar feel of a regular mouse and in our tests put more pressure on the wrist.

The \$129 price tag buys slick design and clever optical technology, but for the same price you could have five BenQ mice.

Details ▶▶

Contact Logitech Australia
Phone (02) 9972 3711
Online www.logitech.com
Price \$129
Verdict ●●○○

Vroom, vroom video

Frustrated by dull, chunky graphics? Ashley McKinnon looks at 18 of the latest video cards that'll breathe new life into your tired system.

Let's face it: we are a society that's turned on by what we see, and nowhere is this more evident than with the humble PC. The picture on your monitor has been processed millions of times over, and the speed and power of the video card determines just how good that picture is.

Swapping your old video card for a new one not only boosts graphics performance through the roof, but it can have the same effect on overall speed. The latest video cards take most of the graphics processing away from the CPU, leaving it free to dedicate more cycles to hands-on work with the OS and applications.

Few other computer components offer such a variety of choice. An enormous selection of chipsets provide the reason for this choice, although most high-end chips come from one of two sources.

The two main players in the high-end video card chipset arena are nVidia and ATI. Both have recently been swapping the role of market leader and there are no signs of this jostling going away, even though nVidia's previous market domination was undeniable. Combined, nVidia and ATI chipsets account for 17 of the cards we tested here. The sole exception was an entry from Matrox — once a force to be reckoned with — the company has spent the last few years trying to win back its position.

Regardless of which chipset sits at the heart of the video card, it's up to the individual vendor as to how they implement that chipset. Individual components such as memory and heatsinks deliver different levels of performance.

As a result, you don't always get what you pay for with a video card. Our Labs Challenge spanned several chipsets and price ranges and we often found lower-priced cards performing just as well or even better than their more expensive siblings.

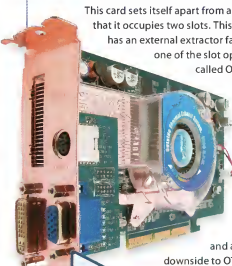
How we tested

The test machine for this Labs Challenge comprised an Athlon XP 1800+ processor sitting atop an AGP 8x compliant MSI KT4 Ultra motherboard fitted with 256MB of PC2100 DDR RAM. The OS was Windows XP Professional updated with Service Pack 1.

The latest drivers for each video card chipset were reinstalled with every

consecutive card. For benchmark testing we chose MaxOnion 3DMark 2001 and Vulpine GLmark. 3DMark tests the video card for DirectX performance while GLmark stresses the video card against a variety of OpenGL tests. By examining the two results you get an overall determination of just how well the video card performs.

Abit Siluro GF4 Ti4200



This card sets itself apart from all the other cards tested in that it occupies two slots. This is because the Abit Siluro has an external extractor fan that pumps air out through one of the slot openings. Using technology called OTES (Outside Thermal Exhaust System), the Abit Siluro sucks air in through the top of the card, channels it over the GPU (Graphics Processor Unit), and then out the back of the system.

The result is a video card that operates at a much lower temperature and in theory produces a much more stable environment, and a longer life for the card. The downside to OTES technology is that it's rather noisy. The fan can be easily heard when under operation, even though it's hidden within the PC's case.

Performance from the Abit Siluro was impressive for an nVidia Ti4200-based card.



Clocking the fastest results in the Ti4200 class, a score of 9,702 from 3DMark was surprising as it's around 5% better than other cards with the same chipset. The GLmark scores also proved this card to be the leader in its class.

What is disappointing is the included software, or to be precise, the lack of included software. The only software to come with the Siluro are the obligatory drivers and a copy of Intervideo WinDVD.

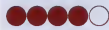
These aside, with the Siluro you almost get Ti4600 performance for the price of a Ti4200 card. If you're working towards a budget, and can't quite stretch to a high-end card, the Siluro could be the ultimate compromise.

Details

Memory 64MB
Bus 4x AGP
Connectors VGA, DVI, TV-Out
Contact Bokerp
Phone 1300 665 377
Online www.bokerp.com.au
Price \$357

Verdict

- ✓ Great performance from the Ti4200 chipset.
- ✗ Not much in the way of bundled software.



AOpen Aeolus Ti4600

The AOpen Aeolus is a twin fan video card. Both fans operate on different parts of the heatsink to keep the card cool. This is just as well as the overall heatsink area provided by the card couldn't be serviced by a single fan.

The card itself is quite long, and we had some trouble locking it into place when inserting into the AGP slot. After a bit of fiddling we did manage to seat the card, but getting it out again was another exercise in frustration.

Once up and running, the Aeolus provided some decent scores in both benchmarks.



3DMark was pushed to a score of 10,173, which put it right among the other Ti4600 cards. GLmark testing, at 88.4 was dead on with another Ti4600 card, the Leadtek WinFast A250, and showed the card was running as it should.

For your money however, the Aeolus doesn't really give you much in the way of extras. The only included software titles are InterVideo WinProducer and InterVideo WinDVD. Both of these are good packages in their own right, but you would at least expect some demo games to see what the card can do. There is also a driver disk to get you started, but no user manual for the card is included. The only documentation is a guide to the nVidia drivers and a manual for the WinProducer software.

Overall, good results are hampered by fiddly installation and a lack of documentation. It does the job, but the Aeolus could have been given a little more polish.

Details

Memory 128MB DDR
Bus 8x AGP
Connectors VGA, DVI, TV-Out
Contact Bluechip Infotech
Phone (02) 8745 8400
Online www.bluechipit.com.au
Price \$752

Verdict

- ✓ Reasonable performance.
- ✗ Can be hard to lock into the AGP slot when installing.

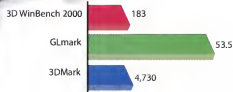


Asus V9180 MX 440

At the entry level end of the nVidia range is the Asus V9180 video card.

Based on the MX440 chipset, this card can't quite match the high performance of the Ti4 cards, but this is reflected in the low asking price.

DirectX 3D performance maxed out with a score of 4,730 from 3DMark. There is no denying that this is a low score, only bettered by the PCI-based Jaton 158-PCI-64Twin at 2,553. Obviously the AGP connector gives the card a little more speed, but when compared to the other cards in this Labs Challenge, a



sub-5,000 score looks poor. Being 8x AGP compliant and with 64MB of DDR memory helps push the MX440 chipset pretty much to its limit, but potential buyers shouldn't expect too much from this card, especially at high resolutions. This was evident when running the high-end 3DMark tests, which saw a dramatic slowdown in frames per second.

A GLmark of 53.5 reaffirms the trend that nVidia-based chipsets are better optimised for OpenGL performance than ATI chipsets. No glitches or blanking were detected while the tests were running.

While \$229 is one of the lower prices of the tested cards, it doesn't represent good value when you look at the performance scores. There are bundled applications and games which help justify the price, but aren't totally redeeming. Sadly, with the Asus V9180, we recommend you save your dollars for just a little longer and go for a higher spec'd card.

Details

Memory 64MB DDR
Bus 8x AGP
Connectors VGA, DVI, TV-Out
Contact Achieva Technology
Phone (02) 9742 3288
Online www.achieve.com.au
Price \$229

Verdict

- ✓ Inexpensive card.
- ✗ Underwhelming performance.



Creative 3D Blaster 5

The Creative take on the ATI Radeon 9700 Pro chipset comes in the form of the 3DBlaster 5. This is a scorching card with 8x AGP and 128MB of DDR Memory, but it's not fast enough to push it to the head of the pack.

While the 3DMark score of 12,508 is impressive, and more than enough to run the latest games and applications, it was just pipped at the post by the Gigabyte Maya II R9700 Pro at 12,692. This is a minimal difference, but as software pushes technology further and with DirectX 9 just around the corner,

tiny performance differences become more evident down the track.

What was interesting with the 3DBlaster 5 was the GLmark score of 55.8. This made it one of only two ATI-based cards to break the 50 mark, the other being the lower specified Gigabyte Maya II R9000

Just like the other ATI 9700 Pro-based cards, the 3DBlaster 5 draws a lot of power, needing an external power connection. It also runs very hot. In fact, after just a couple of minutes of use it was almost too hot to touch. On the plus side, the gold fan and heatsink set against the red PCB give the card a polished appearance. Perfect for the case modder.

Unfortunately, \$899 is a lot of money to pay for any video card, no matter how well it performs.

Unfortunately, \$899 is a lot of money to pay for any video card, no matter how well it performs.



Details

Memory 128MB DDR
Bus 8x AGP
Connectors VGA, DVI, TV-Out
Contact Creative
Phone (02) 9850 0800
Online
www.australia.creative.com

Verdict

- ✓ Great DirectX performance.
- ✗ Very expensive.



Gainward Ultra/750 XP

As another of the nVidia Ti4600-based cards, the Ultra/750 XP set itself apart by coming with twin DVI connectors. There is no native VGA connector present, so connection to a standard monitor had to be handled by a DVI to VGA converter — two of which are supplied as part of the package.

A very high GLmark score of 89.1 was beaten only by the similar specified MSI G4T4600 card, with a score of 89.2. Slight flickering was encountered during OpenGL testing, though it had no impact on the overall result. We also ran Return to Castle Wolfenstein to do a live test

on the Ultra/750 XP and there were no compatibility problems.

DirectX performance was inline with other cards in its class. The score of 10,383 puts it amongst the better performing nVidia-based cards, but it still lags behind the flagship ATI Radeon 9700 Pro-based cards.

The large red PCB of the card posed a problem when trying to insert into the AGP slot on our test system. Being so large, we found it hard to lock into place, but this may not affect all motherboard types. The heatsink area doesn't look that large on the card, but is adequate for the card running cool.

The Ultra/750 XP is a very nice card, but the main drawback is the price. At \$880, it hardly represents good value, and is a little hard to justify, despite its zip. If you are happy spending the money, however, the Ultra/750XP could be considered a competitor to the ATI Radeon 9700 Pro-based cards.



Details

Memory 128MB DDR
Bus 4x AGP
Connectors 2 x DVI, TV-Out
Contact Hallmark
Phone (03) 9540 8555
Online www.hallmark.com.au
Price \$880

Verdict

- ✓ Good performance in both DirectX and OpenGL.
- ✗ Expensive.



Gigabyte Maya II R9000 Pro

At the lower end of the ATI Radeon family we have the Radeon 9000 series chipset, this time in the guise of the Gigabyte Maya II R9000 Pro. While DirectX performance

was average, it was the OpenGL scores that intrigued us, posting the highest amongst all of the ATI-based cards. Aimed directly at the nVidia MX class video cards such as the Asus V9180, the Gigabyte Maya II R9000 Pro gives better DirectX performance but not in OpenGL.

GLmark returned a result of 56, which was way above the

9700Pro and 9500Pro scores in the mid to low 40s. However, you have to take into account the fact that even with a score of 56, the Gigabyte Maya II R9000 Pro is far slower than any of the nVidia Ti4-based cards. Compared to an nVidia MX440 card, the results are very similar.

DirectX testing with 3DMark returned a 7,039, which is enough to run games and applications, just not smoothly at higher resolutions of 1,024 x 768 or above — unless of course you have a ultra high-spec CPU to compensate. This compares favourably though with the 4,673 given back by the MX 440 chipped Asus V9180.

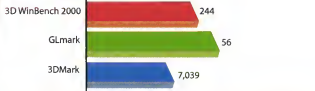
What the Gigabyte Maya II R9000 Pro has in its favour is the price. At just \$229, it represents a cheap way of getting into reasonably fast video performance. And, as with all Gigabyte offerings, there's a variety of included software to keep the most astute of buyers happy.

Details

Memory 128MB DDR
Bus 8x AGP
Connectors VGA, DVI, TV-Out
Contact Rectron
Phone (02) 9748 7725
Online www.rectron.com.au
Price \$229

Verdict

- ✓ Good price and software bundle.
- ✗ Average OpenGL performance.



AGP technology

The AGP (Accelerated Graphics Port) specification was finalised in 1997 to alleviate the graphic bottlenecks inherent in PCI (Peripheral Component Interconnect) technology. Graphics cards had reached a point where they were able to process information faster than the PCI bus could transport it, and graphics cards were commandeering the entire PCI bus. The solution was to develop a new bus technology that would be graphics-specific and not have to share a bus with other adaptors.

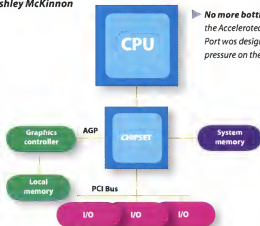
Originally, the AGP 1.0 specification (AGP-1x) ran at 66MHz and allowed for a maximum throughput of 268MB/s, double PCI's peak of 134MB/s. AGP-2x soon followed and doubled the clock rate to 133MHz, providing a maximum throughput of 528MB/s. Information was now able to be passed during both the up and down bus cycles.

As systems became more powerful and developers started pushing graphics technology further and further, AGP evolved as well. The AGP slot's performance doubled again when Intel introduced the AGP 2.0 specification, which allowed AGP-4x. This effectively doubled the amount of data that could be transferred over AGP-2x per clock cycle, maxing out at just over 1GB/s. But consumers had to wait though for memory technology to catch up as 100MHz SDRAM was only capable of 800MB/s. However, with the introduction of 133MHz SDRAM late in 1999, the speed of AGP-4x was finally realised.

Now we have the AGP 3.0 specification, which

encompasses AGP-8x. Once again, data throughput has doubled to 2.1GB/s and assures continuous, uninterrupted transfers for graphical intensive applications such as video streaming. While the video card of today has its own processor onboard, which calculates nearly all of the information that is presented onscreen, AGP-8x makes sure that any correspondence between the graphics card and the CPU is as quick as possible, minimising any lag which may result in visual slowdown or degradation.

Ashley McKinnon



► **No more bottlenecks:** the Accelerated Graphics Port was designed to relieve pressure on the PCI bus.

Gigabyte Maya II R9500 Pro

As Gigabyte's mid-range entry into the world of ATI, the Maya II R9500 Pro is a card that is quite capable of good video performance.

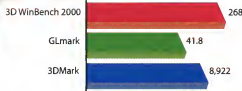
It could be compared to the nVidia Ti4200-based cards in terms of performance. With a 3DMark score of 8,922, it is a considerable step up from the ATI R9000-based cards and would be well worth the extra expense. As with all the ATI-based cards, the GLmark result was disappointing, and at just 41.8 was even slower than the ATI Radeon 9000-based cards.

We did try the Maya II R9500 Pro with Return to Castle Wolfenstein,

a game that relies on OpenGL to provide its graphics. At higher resolutions, such as 1,024 x 768 at 32k colours, the Maya II 9500 Pro started to struggle, and the frame rate hit was noticeable. This confirmed the GLmark results. Hopefully this will be fixed with future driver revisions.

Gigabyte doesn't skimp on the extras you get with the Maya II R9500 Pro. Bundled software includes Power DVD XP, four full version games as well as V-Tuner, Gigabyte's own utility software to allow the Maya II R9500 Pro to be easily overclocked from within the operating system. V-Tuner is included with all ATI-based Gigabyte cards.

As a mid-range card, the Maya II R9500 Pro falls just behind the comparable nVidia offerings. But it's a hard call to say which is better as the soon-to-be-released DirectX 9 may shake up the playing field and produce quite different results.



Details ▶▶

Memory 128MB
Bus 8x AGP
Connectors VGA, DVI, TV-Out
Contact Rectron
Phone (02) 9748 7725
Online www.rectron.com.au
Price \$399

Verdict

- ✓ Plethora of bundled software.
- ✗ Performance could be better.



Gigabyte Maya II R9700 Pro

For all-out DirectX speed, you can't go passed the Gigabyte Maya II R9700 Pro. As the 3DMark results show, a score of 12,692 sent the card to the head of the class — all classes in fact. Being able to take advantage of 8x AGP certainly helped the cause.

Under OpenGL testing, however, the Maya II R9700 Pro, and indeed all the ATI chipped cards suffered heavily, and performed only half as well as the nVidia-based cards at a paltry 43.7. While this may not concern some people, a lot of today's games (especially first person shooter games such as Return to Castle Wolfenstein or Medal

of Honor) rely on OpenGL as their native video mode. In this case, the Gigabyte Maya II R9700 Pro wouldn't be able to offer much more than average performance.

Like all the other ATI 9700 Pro-based cards, the Maya II requires a connection to a floppy type power connector for operation. Obviously the ATI chip draws a lot of power, as is evidenced by the incredible amount of heat generated by the card. After just ten minutes of operation the card was too hot to touch.

Gigabyte pulled out all stops to bundle the video card with enough software to keep you entertained. For the gamer there are versions of Rune, Motocross Mania, Serious Sam, ONI, 4x4 Evo and Heavy Metal FAKK. PowerDVD XP 4.0 rounds out the bundled software. While there's no denying the Gigabyte Maya II R9700 Pro is a stellar performer under DirectX, the slowness of OpenGL might be enough to put off some customers.



Details ▶▶

Memory 128MB DDR
Bus 8x AGP
Connectors VGA, DVI, TV-Out
Contact Rectron
Phone (02) 9748 7725
Online www.rectron.com.au
Price \$799

Verdict

- ✓ Top notch DirectX performance.
- ✗ Card runs very hot, OpenGL unimpressive.



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- 32Mb DDR RAM 3D AGP 4X Graphics
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- Logitech Internet K/B & Optical Mouse
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- **Microsoft® Windows® XP Professional**
- **Microsoft® Office® XP Small Business**

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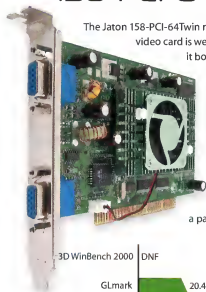
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Shop2/110 Walker St Fax: 02-99292865

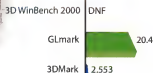
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Jaton 158-PCI-64Twin



The Jaton 158-PCI-64Twin reaffirms the notion that the PCI video card is well past its use-by date. Although it boasts the nVidia GeForce4 MX 440 chipset, it's plain to see that the PCI bus is the major limiting factor that pushes this card down to the bottom of the pile.

Scoring only 2,553 on 3DMark, many of today's notebooks can surpass the video speed of the 158-PCI-64Twin. It was obvious immediately that the card was slow: watching 3DMark run was a painful experience — the frame rate



dropped to around 10fps in some sections. Other AGP cards based on the MX 440 chipset returned benchmarks scores nearly twice as good, which once again demonstrates that the PCI bus is just too slow to be taken seriously. A GLmark score of 20.4 merely reinforced our disappointment.

Like its big brother, the Jaton 3DForce 4, no software apart from the standard drivers are included with the card.

The only real situation where the 158-PCI-64Twin would be an option is on an older system that doesn't support AGP — but in that case the CPU would more than likely not be fast enough to service the MX440 chipset — bit of a catch-22.

Unless you really have to go for a PCI option, steer well clear of the Jaton 158-PCI-64Twin. If PCI is indeed your only option, we recommend spending the money elsewhere on your system to bring it more up to date. At least it can be run in dual-head mode to drive two monitors.

Details ▶▶

Memory 64MB DDR
Bus PCI
Connectors VGA
Contact Jaton Technology
Phone (03) 9873 3999
Online www.jaton.com.au
Price \$210

Verdict

- ✓ Nicely packaged.
- ✗ Way too slow to be taken seriously.



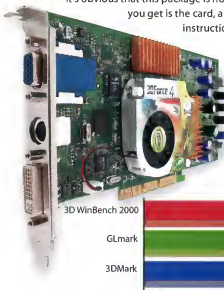
Jaton 3DForce 4

One look at the small box the Jaton 3DForce 4 card comes in and it's obvious that this package is not exactly rich in extras. What you get is the card, a driver CD and a simple instruction pamphlet.

The card is based on the nVidia Ti4600 chipset and is quite large. Like some of the other larger cards tested, the 3DForce 4 was difficult to insert and lock down. Once again, this is all dependent on your motherboard type as a range of different lockdown mechanisms are used.

A 3DMark score of 10,168 showed the nVidia chipset was being put to good use and was in line with the other Ti4600-based cards. Couple this with the GLmark score of 88.3 and you have a video card that is more than capable of servicing the latest games and graphics-intensive applications. The card failed the 3DMark Hi-Res Dragotic test twice, but reinstalling the latest nVidia Detonator drivers prevented this problem from occurring again.

For the price the Jaton 3DForce 4 represents good value for money — but if you are expecting to open the box and have some goodies to play around with you should look elsewhere. Long term reliability may also be an issue considering the problems we had running the benchmark, so make sure you hold on to your receipt just in case.



Details ▶▶

Memory 128MB DDR
Bus 4x AGP
Connectors VGA, TV-Out
Contact Jaton Technology
Phone (03) 9873 3999
Online www.jaton.com.au
Price \$500

Verdict

- ✓ Decent performance from the Ti4600 chipset.
- ✗ Absence of bundled software.



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- Lee Johnson, Home PC User

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LeadTek WinFast A250 Ultra TD

The first thing you notice when you take the LeadTek WinFast A250 out of the box is just how heavy it is. This can be attributed to the large heatsink assembly, coupled with the twin cooling fans.

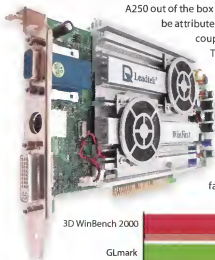
The fans are protected by a mesh grill to prevent any dust build-up that could affect the spinning motion. All that cooling surface works well, as the card never overheated, regardless of how long it was left running.

With a 3DMark score of 10,266, the WinFast A250 is a fast video card, although it's limited

by being only AGP 4x compatible. While it can't quite match the raw performance of the ATI 9700 Pro-based cards for DirectX applications, it more than makes up for it with a very high GLmark score of 88.4.

To complement the card, the package also includes both utility and game software bundles. For after hours you get Aquanox, Master Rallye, Black Thorn and a collection of demo version games. Creative minds are catered for as well with Ulead VideoStudio and Ulead Cool3D to help demonstrate just what this card can do.

The LeadTek WinFast A250 is a good card and should satisfy just about any would-be gamers' wants and needs. High scores in both benchmarks confirm that this card is capable of fast rendering, no matter which format you choose. However, being only 4x AGP compatible, it's not the latest-and-greatest.

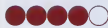


Details ▶▶

Memory 128MB DDR
Bus 4x AGP
Connectors VGA, DVI, TV-Out
Contact Rectron
Phone (02) 9748 7725
Online www.rectron.com.au
Price \$649

Verdict

- ✓ Very fast performance.
- ✗ Limited to AGP 4x only.



LeadTek WinFast A280 LE TD

Just like its big brother the Leadtek WinFast A250, the A280 LE is a very heavy video card, adorned with a heatsink that covers almost half of the card. This time, however, there is only one fan for cooling and it runs silently.

Built around the nVidia Ti4200 chipset, the WinFast A280 LE produced only average results in its class, especially when compared to the likes of the Abit Siluro, which has half the amount of onboard RAM at 64MB. Although it is rated at 8x AGP, the results certainly didn't lead us to believe that this was the case.

OpenGL scores were very similar to other Ti4200 cards at 81.3, but still almost twice as fast as any ATI-based offering. The screen blanked while the OpenGL tests were being run, but had no bearing on the end result. We ran Medal of Honor to make sure OpenGL worked and the game ran flawlessly.

The instruction manual is very simple and concise, with clear images showing details of the card and how to use it.

Bundled software comes in the form of Ulead VideoStudio 6, Ulead Cool3D as well as Black Thorn, Aquanox, Master Rallye and the Games Gallery demo collection.

While this is a good card and a decent performer, we could hardly recommend the WinFast 280 LE as a must have. If you are looking around for a Ti4200-based card, but want performance almost as good as a Ti4600 card, then the Abit Siluro would be your best bet.



Details ▶▶

Memory 128MB DDR
Bus 8x AGP
Connectors VGA, DVI, TV-Out
Contact Rectron
Phone (02) 9748 7725
Online www.rectron.com.au
Price \$499

Verdict

- ✓ Good documentation and software bundle.
- ✗ Screen blanked on OpenGL tests. Average performer.



Matrox Parhelia

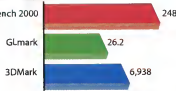
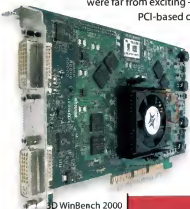
The only reason for wanting to buy a Matrox Parhelia would be if you had a burning desire for something different. Performance scores were far from exciting — the only units to score less were the PCI-based cards.

Designed with the graphics professional in mind, the main drawcard for the Matrox Parhelia is the fact that it can output a display to three separate monitors simultaneously. While this is a great way to view games and graphic applications, the Parhelia just can't cut it when it comes to all-out speed. We had to re-check the 3DMark

scores three times before accepting the mediocre 6,938. While the Parhelia provides adequate performance at lower resolutions, if you're spending close to \$800 on a video card you'd expect a lot better. The GLmark score of just 26.2 showed that running applications in OpenGL mode doesn't improve the situation.

For the graphics professional who needs to work within large desktop areas, usually bigger than the native screen, the Parhelia is a good choice. Being able to fire two or three screens at once has its advantages, but for the average home consumer this ability just doesn't justify the extra expense. For the same money you can get a high-end nVidia or ATI-based video card and be much happier with the end results.

The IT community was eagerly awaiting the release of the Parhelia, hoping it would bring Matrox back into the fray, but it just doesn't deliver the goods.



Details ▶▶

Memory 128MB
Bus 4x AGP
Connectors 2x DVI
Contact Focal Point Computing
Phone (03) 9372 6600
Online www.focalpoint.com.au
Price \$781

Verdict

- ✓ Can be set up for a variety of output options.
- ✗ Very low performance.



MSI G4Ti4200

Although it has 8x AGP potential, the MSI G4Ti4200's average performance didn't exactly heighten the senses. Unlike its sibling, the G4Ti4600 with its class-leading scores, the G4Ti4200 is just another card in a sea of competitors, with nothing to make it stand out.

During the OpenGL test with GLmark, the MSI G4Ti4200 suffered from the same glitch as a few other cards. During one of the tests the screen blanked, then flickered rapidly. This had no bearing on the end result but

could point to some compatibility problems down the line. The score of 81.8fps was average for a Ti4200-based card, but still better than any of the ATI-based cards.

3DMark returned a score of 9,175 which was only average. Admittedly, during some of the testing we noticed the fps max out at 245, which was one of the highest we saw of any of the tested cards — but the overall score wasn't great.

Where MSI tries to entice you as a buyer is with the software bundle. A multitude of full version games, such as Black Thorn, and utilities certainly sweeten the deal.

While the MSI G4Ti4200 performs as it should, there are similarly spec'd cards that offer more, such as the Abit Siluro GF4. That's not to say the G4Ti4200 can't service today's applications and games, but future usability must be questioned.



Details ▶▶

Memory 128MB DDR
Bus 8x AGP
Connectors VGA, DVI, TV-Out
Contact MSI Computer
Phone (02) 9748 0070
Online www.msicomputer.com.au
Price \$439

Verdict

- ✓ Large range of bundled software.
- ✗ Average performance.



MSI G4Ti4600

Ranking as the fastest Ti4600-based card we tested, the MSI G4Ti4600 has what it takes to produce a spectacular visual experience.

Although only a 4x AGP rated video card, a 3DMark score of 10,789 pushed it to the top of all the nVidia-based cards.

It still lagged slightly behind the ATI Radeon 9700 Pro cards, but the gap was closing.

The MSI G4Ti4600 also posted the fastest OpenGL score, with GLmark returning a healthy 89.2. The only other video card to come close to this was the Gainward Ultra 750XP at 89.1.

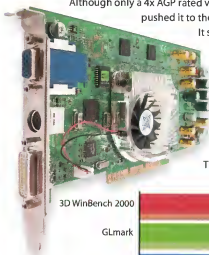
The MSI G4Ti4600 didn't suffer from

random flickering, as experienced with some of the other Ti4600-based cards when using OpenGL testing. This helps confirm this model as a reliable, stable piece of hardware.

The card has a rather dull looking heatsink and fan, as well as the standard PCB green colour scheme. The heatsink and fan seem too small to be able to cool down a hot-headed beast such as this, but they proved to be adequate for the purposes of our testing.

Late nights are assured with bundled games such as No One Lives Forever, Aquanox, Sacrifice and a demo games CD. For more productive work you can try out MSI DVD, InterVideo WinProducer, VirtualDrive, RestoreIT and a collection of MSI utilities.

Fast but bland would be the best way to describe the MSI G4Ti4600, as it's a scorcher in the performance stakes, but fails to ignite in the fashion stakes. Then again, with benchmark scores this high, it really doesn't matter.



Details ▶▶

Memory 128MB DDR
Bus 4x AGP
Connectors VGA, DVI, TV-Out
Contact MSI Computer
Phone (02) 9748 0070
Online www.msicomputer.com.au
Price \$829

Verdict

- ✓ The fastest score of all the Ti4600-based cards.
- ✗ Expensive, bland looking PCB.



PowerColor Evil Commando 2

This ATI Radeon 9700 Pro-powered video card from PowerColor is a state of the art, high-end solution for the graphics professional and hardcore gamer alike. Performance under DirectX

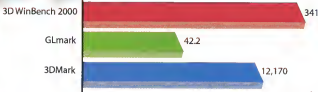
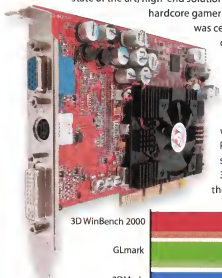
was certainly impressive, but was still outclassed by other ATI Radeon 9700 Pro cards.

It's interesting to see how several cards based on the same chipset can return different scores when tested with benchmark software. The PowerColor Evil Commando 2 scored a healthy 12,170 under 3DMark, but this is less than the similarly spec'd Gigabyte and

Creative cards, both utilising the ATI Radeon 9700 Pro chipset. That aside, it's still a top class score, especially when compared to nVidia's flagship Ti4600-based video card that couldn't even break the 11,000 barrier.

And, just like all of the ATI-based cards, OpenGL performance wasn't impressive. With a paltry 42.2 from GLmark, the Evil Commando 2 certainly doesn't live up to its namesake. In its favour though, no glitches or flickering were detected when either benchmark was run.

Also in its favour is the price. At \$720, it's the cheapest of the ATI Radeon 9700 Pro-based cards, and the saving in money may be worth the slight trade off in performance. Keep in mind the ATI Radeon-based cards have full support for DirectX 9 built-in so future performance should only get better. Let's just hope the OpenGL portion is addressed soon to bring it more in line with DirectX performance.



Details ▶▶

Memory 128MB
Bus 8x AGP
Connectors VGA, DVI, TV-Out
Contact Altech Computers
Phone (02) 9735 5655
Online www.altech.com.au
Price \$720

Verdict

- ✓ Cheapest of the ATI Radeon 9700 Pro cards.
- ✗ Poor OpenGL performance.



PowerColor Evil Commando X

PowerColor has an interesting approach to naming its video cards, and just like its big brother, the Evil Commando 2, the ATI Radeon 9500-based Evil Commando X lulls you into thinking it's a hard hitter.

Don't get us wrong, it is a good performer, but for the price you'd expect a little more.

In terms of DirectX performance, the Evil Commando X is pretty well on par with the nVidia Ti4200-based cards. Just breaking the 9,000 barrier at 9,088, the 3DMark results show the Evil Commando X's potential. And, with only half the amount of memory as most of the nVidia-based cards, it shows

its graphic processing is optimised for heavier loads. We did have a few problems running 3DMark, however — it failed the first three times we attempted to run it. Re-installing the ATI Catalyst drivers fixed the problem, but then we also experienced problems running GLmark. Once again, re-installing the ATI Catalyst drivers fixed the problem, but this could be a precursor to incompatibility issues.

GLmark just re-affirmed the trend for ATI-based cards and returned a lowly 41.8. This puts it even with the similarly specified Gigabyte Maya II Radeon 9500 with the same score. Even the low-end nVidia MX440-based Asus V9180 was able to break 50 hurdle at 53.5.

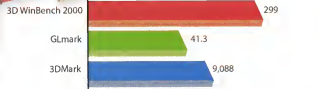
The price tag of \$573 is quite expensive for a card that, although average, is far from fantastic. For that kind of money you can get yourself an nVidia-based card that performs better on both DirectX and OpenGL fronts. That should make the decision a little easier.

Details

Memory 64MB
Bus 8x AGP
Connectors VGA, DVI, TV-Out
Contact Altech Computers
Phone (02) 9735 5655
Online www.altech.com.au
Price \$573

Verdict

- ✓ Good DirectX performance.
- ✗ Price a little hefty.



Sapphire Radeon 9000 Atlantis Pro

With 128MB of DDR RAM, the Sapphire Radeon Atlantis Pro sounds impressive, and at the bargain price of just \$229 it represents good value for money.

While it may not compare to some of the high-end cards, such as the nVidia Ti4600 or ATI Radeon 9700 Pro-based offerings, this card has the budget buyer in mind, someone who has to trade off performance for affordability.

Scores weren't too bad, though. 3DMark ran smoothly and returned a 7,017, making the Sapphire Radeon 9000 Atlantis Pro slightly slower than the similarly specified Gigabyte Maya II

Radeon R9000 Pro at 7,039. Compared to the nVidia-based cards, this score puts it mid-way between the MX440-based card and the Ti4200-based card. GLmark threw back a score of 49.1, which again put it a little behind the Gigabyte Maya II Radeon R9000 Pro card.

One thing that's instantly noticeable about the Sapphire card is that the fan and heatsink are married together into a single entity, so if the fan fails, the whole lot has to go.

The presence of both a VGA and DVI connector means the Sapphire Radeon Atlantis 9000 Pro can be attached to two separate monitors simultaneously. This is unusual for a sub-\$250 card, and you won't find anything nVidia powered with this functionality for around the same price.

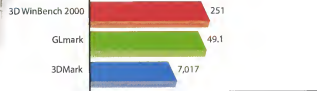
For those on a budget, the Sapphire Radeon 9000 Pro could be the answer to your needs as it finds the perfect middle ground between price and performance.

Details

Memory 128MB
Bus 4x AGP
Connectors VGA, DVI, TV-Out
Contact Achieva Technology
Phone (02) 9742 3288
Online www.achiva.com.au
Price \$229

Verdict

- ✓ Low price.
- ✗ OpenGL performance may not be enough for some.



Handy hardware

Adam Yap gets to grips with all the latest Palm and Pocket PC handhelds.

A booming market isn't always a good thing. Consider what's happened in the handheld sector over the past few years. Handhelds used to be the hottest item in town, so much so that when APC began to list contenders for this Labs Challenge, we were wondered how we'd fit all the brands and models onto the allotted pages. At the same time, many of those were OEM clones with little to distinguish one unit from another.

Yet our long list quickly became a very workable shortlist as we crossed off the no-shows. Palm and Handspring have culled their once confusingly broad product lines to a mere handful of models. Hewlett-Packard's Jornada range has disappeared altogether, with the superior IPAQ series now the standard-bearer for "the new HP". As the market tightened, individual models fell off the chart from other brands.

That rationalisation makes it easier to choose the right handheld for your needs, especially as the shake-out has also seen a segmentation of products with emphasis on "budget" and "burner" products. The budget models strive to maintain the most affordable price by culling extras such as expansion card slots, as well as paring back processor speed and memory. If they can shoehorn this into a slim or compact form factor, that's a bonus. Higher-end devices opt for faster chips, built-in wireless and other gadget-ware trimmings.

One thing that hasn't changed has been the tussle between Microsoft and Palm. While new developments, such as the introduction of Palm OS 5.0, narrow the gap between the two platforms, they remain fundamentally different in focus. Yet in the end, choosing between a Palm or a Pocket PC is becoming less about feature sets and more about the way in which people use their devices. It's best to get a feel for the device in-store or, borrow a Palm or Pocket PC to try it out in an everyday setting.

For users on a tight budget, Palm is for the time being the only choice. It's important to remember that an expansion card is necessary to use much of the multimedia functionality of the Pocket PC, so include the price of an SD or Compact Flash card into your budget.

The rated battery life of each of these handhelds varies between 10-20 hours, depending on the model, features, OS and of course your usage pattern (contact each manufacturer for specific details).

This Labs Challenge represented all the handhelds available to APC at the time of writing. The absentees were Acer and NEC, who were unable to supply their respective handhelds.

Palm Tungsten T

Palm's flagship device is equipped with a 144MHz Texas Instruments OMAP processor and runs the new Palm OS 5 operating system.

The first thing that catches your eye on the new Palm is the sliding panel which alternately covers and reveals the Graffiti input area. This slide includes the four standard hardware buttons, as well as a new four-way directional pad to replace the normal up and down buttons found on all other models.



The slide seems a bit gimmicky at first, but it makes sense after a deal of use. When slid out, the Tungsten T resembles a full sized Palm handheld with good size buttons and a large screen.

When retracted, the Tungsten T transforms into a short handheld that fits easily in the hand as well as a pocket or purse.

The Tungsten T is also surprisingly usable while the slide is retracted, due to the versatility of the four-way directional pad and the action button in the middle. Most common actions can be done single-handedly without needing the stylus.

When it is called for, that stylus remains one of Palm's strong points. The unique pop-up pen looks great and feels wonderful in the hand. The dedicated record button is another sensible touch, making it easy to use the Tungsten T like a conventional dictation device.

The performance of the OMAP processor was also impressive, equalling the speedy Sony CLIE NX70V.

A stereo headphone jack is built into the Tungsten T, but MP3 playback doesn't yet ship with the device (Real Networks is one of many companies working on an MP3 player for the Tungsten T).

The Tungsten T is the first Palm handheld with built-in Bluetooth networking, which is well integrated with the basic applications; we could easily dial a number on a Bluetooth phone directly from the address book.

Details ▶▶

OS Palm OS 5
Processor 144MHz TI OMAP
RAM 16MB (14MB usable)
Screen 320 x 320 x 65,535 bit
Expansion SD
Battery Lithium Ion rechargeable
Contact Palm
Phone 1800 350 535
Online www.palm.com/au
Price \$1,099

Verdict

- ✓ 144MHz processor with Palm OS 5, very small size and sliding Graffiti area, built-in Bluetooth.
- ✗ No native MP3 playback.



02 XDA

With a built-in mobile phone and an impressive feature set, the O2 XDA is Pocket PC's answer to the Handspring Treo. It's a sleek piece of hardware, with a sleek metal shape that fits easily in the hand. While smaller than an IPAQ it feels heavier and more substantial. It's a little wide in the hand, and the weight can make it a bit tiresome to hold to your ear for more than 20 minutes.

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EDITOR'S
CHOICE
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2003

The mobile-tweaked Phone Edition of the Pocket PC 2002 OS was more than functional but still seemed less mature when compared to Handspring's Treo. With few dedicated hardware buttons, making calls often required the use of the stylus or tapping the screen with your fingers. While tolerable, this took more time than with a normal mobile phone or a Treo.

The ringer and vibrate functions were excellent, being both loud and strong, and the ability to assign any WAV file as a ring tone is a great feature. Sound quality using both the phone and the included stereo headset was comparable to a normal mobile.

Data connectivity was where the XDA really shined. Although Pocket IE does a less than adequate job of displaying full size Web pages, the killer feature of the XDA was the ability to multitask while being constantly connected via GPRS. The XDA can receive instant messages from MSN Messenger or download email in the background. This substantially reduces the amount of waiting and switching between applications.

Disappointingly, the XDA only has 32MB of RAM onboard compared to the now standard 64MB. The SD slot is also strictly only for memory—as it's not SDIO compliant, it can't be used for accessories.

Details

OS Pocket PC 2002
Phone Edition
Processor 206MHz
StrongARM
RAM 32MB
Screen 240 x 320 x 12 bit
Expansion SD (memory only)
Battery Lithium ion
rechargeable
Contact Telstra
Phone 12 51 11
Online www.telstra.com.au
Price \$1,699

Verdict

- ✓ Integrated mobile phone, excellent data support with GPRS, great metal construction.
- ✗ High cost of GPRS, SD slot is only usable for memory.



Palm vs Pocket PC

The first choice most handheld buyers must make is between the Palm and Pocket PC platforms. It's not as simple as Holden versus Ford though because the platforms are so totally different in both architecture and philosophy.

The Palm OS is designed with simplicity in mind, which is both its greatest strength and the major cause for criticism. The Pocket PC, as its title implies, is more like a handheld version of the desktop PC platform computer than a personal digital assistant. This gives it more power and more flexibility but often makes it more complicated.

COMPARING THE TWO

It's important to keep these differences in mind when comparing the specifications of the two platforms. For example: Pocket PC handhelds have faster processors (upwards of 200MHz) and more RAM (between 32MB and 64MB) than Palm devices, but that doesn't make them any faster per se. The higher spec set is due to the overhead of the Windows-based Pocket PC operating system as well as the need to cater for advanced features such as audio and video playback and built-in wireless.

Most Palm handhelds get by with a nimble 33MHz chip and 8-16MB of RAM, yet they're just as quick and responsive (and sometimes more so) as Pocket PCs. This is because the Palm OS was designed from the ground up as a handheld operating system, and because the native Palm OS doesn't offer the higher-end capabilities of Pocket PC devices. Likewise, apps on Pocket PC tend to take up more memory than their Palm equivalents. But not everything is relative: processing power is going to be more important when calculating spreadsheets, as is storage space for large files like ebooks.

This Labs Challenge sees the arrival of the first two Palm OS 5 devices, with significantly more powerful processors and multimedia abilities. It also marks the death of the non-rechargeable battery, thankfully even the lowliest Palm now comes with a rechargeable Lithium ion cell.

The Pocket PC has also had some exciting changes, but not in the OS, which remains at the 2002 edition. Processors have moved from the 206MHz Strong ARM to 300MHz and 400MHz Xscale chips from Intel. Unfortunately, the Pocket PC 2002 OS hasn't been optimised for the new class of processors, resulting in little, if any, visible performance increase. The new processors may come into their own when a new version of the OS is released by Microsoft.



Handspring Treo 270

The Treo 270 is the latest version of Handspring's innovative combination mobile phone and PDA device. Despite being a hybrid device, the Treo is a pretty decent Palm in itself, losing little in the way of functionality apart from lacking an expansion slot, which made the 16MB of memory particularly welcome.

The keyboard was probably the best implementation of an on-device Palm keyboard to date; we were able to get pecking at 50 words per minute. The keyboard was also backlit for night operation.

The phone produced a reasonable sound quality, but not as good as a dedicated phone. The only problem was with the flip cover; when opened, the Treo became long and awkward to hold. The included hands-free headset worked well. It was easy to make calls using the address book as well as dialling numbers using the keyboard.

The colour screen was one of the poorest of in this roundup, with uneven light distribution and with poor visibility in bright light, to the extent that the Treo was practically unusable on a fine day outside.

The Treo is great as a data device, and definitely better than any combination of phone and PDA, even if you're using a Bluetooth connection. But forget about connecting to the Net via GSM, as this is very slow and extremely expensive. On the other hand GPRS, which is available through a downloadable upgrade, is excellent, with sufficient speed and an always-on connection. The included Blazer browser did a great job of reducing full size pages for display on the small screen and One-Touch Mail was a usable POP mail client. The downside was the price of GPRS — from 0.8c to 2.2c per KB.

A greyscale Treo, the 180 is also available for \$300 less, with Graffiti but without the keyboard.

Details ▶▶

OS Palm OS 5
Processor 33MHz Dragonball
RAM 16MB
Screen 160 x 160 x 16 bit
Expansion None
Battery Lithium ion
Rechargeable
Contact Handspring Australia
Phone 1300 728 725
Online
www.handspringaustrali.com
Price \$1,599

Verdict

- ✓ Integrated mobile phone, excellent data support with GPRS, fantastic on-device keyboard.
- ✗ Bad screen visibility in direct sunlight, high cost of GPRS, awkward flip.



HP iPAQ 3950

Using the same familiar design as all iPAQ models since the groundbreaking 3630, the updated 3950 comes with probably the best screen out of all the Pocket PCs in this line up — a 3.8" transreflective display that looked great indoors and out. It's also the biggest display we looked at, on par with the Sony CLIE NX70V.

The 3950 comes with what's now a common allocation of 64MB of memory plus an SD card slot. It also employs the standard iPAQ expansion sleeves, which makes up for the lack of a CompactFlash card slot if you don't mind the additional bulk.

A welcome feature is the expanded file store, which provides a huge 22MB storage area in the flash ROM. It's not as fast to write to or read from as regular RAM, but it survives a hard reset and is ideal for storing MP3s.

The 3970 has the best placed dictation button of all the handhelds reviewed, with the user's left thumb sitting naturally on the button, making it very easy to use. Hewlett Packard hasn't yet modified the design to include some sort of scroll wheel, although the sleeve design would make the placement of such a wheel challenging.

The battery life was excellent for a Pocket PC and was on par with most modern, colour Palms.

Bundled software including the infrared remote controller Nevo, a task switcher, backup utility and a free copy of Dashboard, a Today screen replacement.

If you can spring for an extra \$400 then you can up-scale to an iPAQ 3970 which adds integrated Bluetooth, but that's a lot to pay for the relatively limited application of Bluetooth at this stage. Stick with the base model iPAQ 3630 and it's hard to go wrong.

Details ▶▶

OS Pocket PC 2002
Processor 400MHz XScale
RAM 64MB
Screen 240 x 320 x 16 bit
Expansion SD, iPAQ Sleeves
Battery Lithium ion
Rechargeable
Contact Hewlett-Packard
Phone 1300 302 308
Online www.hp.com.au
Price \$999

Verdict

- ✓ Beautiful 3.8" screen, optional expansion sleeve, extra 22MB file store in ROM.
- ✗ No jog dial or rocker.





Palm m130

Palm's first foray into the budget market kicked off a few years ago with the m100 series. The only remainder now from that series is the m130. The arrival of the Zire has nudged the m130 up to become the "mid-range" Palm, which combines a compact size and friendly shape with more advanced features than the no-frills Zire.

At \$479 the m130 is the cheapest colour device in this Labs Challenge, and you get quite a lot of handheld for your money. The m130 matches the feature set of its slicked and more expensive cousin, the m515 (with the exception of the 16MB of RAM; the m130 comes with just 8MB).

That includes an SD slot for loading additional memory, and the Universal Connector for adding a range of hardware accessories, such as modems, keyboards and connectivity cables.

The m130's design might not be as sexy as the chic m515, but it makes up for that with the availability of interchangeable plastic cases offered in a riot of colours and patterns.

The m130 also feels more robust, partly due to the plastic screen that's less prone to cracking.

Where it's a little weak is in the screen. With a 12-bit colour depth the m130 can only display 4,096 colours, compared to other 16-bit colour PDAs which can handle 65,536 colours. But this is really only noticeable when viewing photos, as most games and applications will look identical.

A flip cover made of pliable plastic protects the screen while exposing the digital clock display. The screen itself is physically smaller than the average Palm display but, as it uses the same 160 x 160 resolution, the effect is a denser, more readable display (when it's not washed out by direct or brightly diffused light).

Details ▶▶

OS Palm OS 4.1
Processor 33MHz Dragonball
RAM 8MB
Screen 160 x 160 x 12bit
Expansion SD
Battery Lithium Ion rechargeable
Contact Palm
Phone 1800 350 535
Online www.palm.com/au
Price \$479



Verdict

- ✓ Cheapest colour handheld reviewed, handy construction.
- ✗ Poor colour screen.



Palm m515

The m515 is the update to Palm's successful Palm m505 handheld with 16MB of memory and a vastly improved screen. Compared to the m505, the new display comes with a "High" brightness setting and a "sticky" backlight that remembers its state even after the m515 is switched off.

The downside is that if left on High, the screen drains the battery significantly faster. The Graffiti area is also no longer backlit, which was one of the m505's best features.

The form factor compares to the m505, with the same cool, grey metal exterior and excellent build quality. A single SD slot sits atop the device while a Universal Connector below provides expansion facilities. The Universal Connector, used on most of Palm's existing range, is still the most widely supported connector for HotSync cradles, cables, keyboard and other accessories. And they're far easier to find and often cheaper than equivalent accessories for Sony.

The hardware buttons on the device are the best we've seen on a Palm OS device — they're well sized with great tactile feedback and slightly indented to allow easy pressing using the stylus. The stylus feels sufficiently heavy and comfortable in the hand.

The vibrating function is a great idea, but it's not powerful enough and alarms can easily be missed; don't expect it to be as strong as an alarm on a typical mobile phone.

Following a recent price drop, the m515 represents great value for an ultra-compact PDA with good construction. The Universal Connector and established chassis shape means there's no shortage of third-party expansion options, cases and accessories.

Although not as fancy as the hi-resolution Sonys, it does the job admirably well and at a reasonable price.

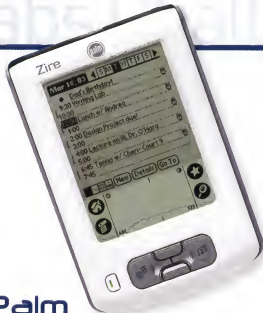
Details ▶▶

OS Palm OS 4.1
Processor 33MHz Dragonball
RAM 16MB
Screen 160 x 160 x 16 bit
Expansion SD
Battery Lithium Ion rechargeable
Contact Palm
Phone 1800 350 535
Online www.palm.com/au
Price \$668



Verdict

- ✓ Slim, metal construction, great hardware buttons.
- ✗ Limited feature set.



Palm Zire

Designed from almost every angle down to a specific price point (US\$99, which translates here into a less catchy \$249) and target market (mainstream consumers who are first-time users of handhelds), the Zire has a style all its own.

The clean white exterior is reminiscent of Apple's iBook and iPod devices, and a far cry from the bulbous black plastic m100 series. In fact, the Zire's not much bigger than the Tungsten T and weighs less than the higher-spec m515. For the low price you also get a rechargeable lithium battery and a crisp screen.

One sacrifice made to keep the price down is the desktop cradle, which isn't a surprise at this end of the market, and is in fact preferable for those who travel.

Also missing are the Universal Connector port, which means accessories like modems or keyboards are out of the question; an SD card slot; a backlight for the 160 x 160 greyscale screen; and the todo, memo pad and HotSync hardware buttons.

For a non-backlit screen however, the display is extremely good, being readable in most light conditions with its adequate sharpness and contrast.

The Dragonball processor is 16MHz, which is adequate for the basic date and address book but starts to feel a bit sluggish with more advanced apps. Likewise, the 2MB of RAM seems fairly cramped in an age of 16MB machines.

Coming as we did from the perspective of a power user, it's surprising to see how appealing the low-end Zire is as a plain Filofax replacement. But what you see is what you get, and if you're looking for any more features or future-proofing, look elsewhere.

Details ▶▶

OS Palm OS 4.1
Processor 16MHz Dragonball
RAM 2MB
Screen 160 x 160 x 4 bit
Expansion None
Battery Lithium Ion rechargeable
Contact Palm
Phone 1800 350 535
Online www.palm.com/au
Price \$249

Verdict

✓ A great beginner's Palm, lightweight and small.

✗ No expansion options, no backlight, only 2MB of memory.



Sharp Zaurus 5500

The Sharp Zaurus breaks the mold from every other device here. Externally, it's already pretty special, with dual CompactFlash and SD expansion slots, a removable battery and an innovative slide out thumb board, it's definitely speeded to the hilt. But what's even more interesting is looking underneath the bonnet — powering this device is neither the Palm or Pocket PC operating systems, but Linux.

The Zaurus 5500 runs off Lineo Embedix, which is built on the Linux 2.4 kernel and with the appropriate downloads the Zaurus can operate all the way down to shell level, with Bash and GNU utilities. What's great for coders is the Java VM is pre-installed on the Zaurus.

The OS aside, the 5500's PIM functions are very similar to those on the Pocket PC and Palm and it's clear that Zaurus deliberately modelled itself after the two market leaders. Synchronisation tools to Outlook and the Palm Desktop are included to remove some of the pain from switching to the new platform. The desktop sync software is less mature than Palm and Pocket PC but quite serviceable.

Third party software is limited compared to Palm, unless you're comfortable with Linux development, in which case countless applications could be ported over to the handheld with a reasonable effort.

The Zaurus is potentially far more capable than the offering both from Palm and Pocket PC, but the amount of technical knowledge required would exceed all but the most hardcore users. There have been reports that GCC, Perl and Python work well on the Zaurus.

With a mature and capable operating system, keyboard and stacks of expansion, the Zaurus 5500 feels more like a portable PC than any other handheld in this line-up.

Details ▶▶

OS Lineo Embedix (Linux 2.4 Kernel)
Processor 206MHz
Strong ARM
RAM 64MB
Screen 240 x 320 x 16 bit
Expansion SD and Compact Flash
Battery Lithium Ion rechargeable
Contact Sharp Australia
Phone 1300 13 55 30
Online www.sharp.net.au
Price \$1021

Verdict

✓ Linux operating system, good expansion and great built-in keyboard.

✗ Expensive, little third party software, less mature desktop tools and synchronisation software.





He's just sent a pile of spreadsheets flying.

OBSERVATION: When you leave the office to work, you leave behind many of the tools and resources you need to work with. Which means you can't leave the office if you want to get anything done. Crazy. Wireless technology can resolve this paradox, fast.

SUGGESTION: Investigate Toshiba's new e740 Pocket PC with integrated Bluetooth™. Add a Bluetooth-enabled data phone, and you can take a lot with you, do a lot with it, and once you've done it, send it on its way.

RESULT: You can carry gigabytes of data around in your e740's two card slots, and work on it with Pocket PC programs like Excel and Word. Job done? Attach your output to an email and send it to the world via your Bluetooth phone. Or use Explorer to access the internet, download data or documents, massage and manipulate them, and then send them where they belong. Goodbye office, hello cappuccino.

ACTION: For more information about wireless, talk to your Toshiba MobilePlus specialist reseller, visit www.unplugme.com.au or call 13 30 70 for a Wireless for You information kit.

TOSHIBA e740 Pocket PC: Intel® PXA250 400MHz Xscale™ processor/integrated Bluetooth or Wi-Fi/SD and CF/II slots/64MB RAM/long battery life/Microsoft® Pocket PC 2002 OS.



TOSHIBA

Sony Clie NX70V

The major feature of the NX70V (reviewed in APC January, page 50) is the introduction of the 200MHz XScale processor and Palm's new OS 5 operating system. The processor and OS partnership blitzed through all the OS 5-compatible applications we tested, especially optimised applications such as JPEG image viewers and spreadsheets.

The overall design of the NX70V remains unchanged from Sony's previous flagship model, the NR70V, in that it employs Sony's unique clamshell design which flips open to reveal a massive 320 x 480 screen and a thumb board. A 640 x 480 digital camera sits in the hinge, while MP3 playback rounds off the feature list.

The camera quality is great considering the small size, but with a meagre 0.3 megapixel rating it's in no way a replacement for even a low-end digital camera. And while it also records MPEG video, the low 160 x 112 resolution means that the clips are of limited use.

The thumb board's limited size means that it's no replacement for a full size keyboard like a Stowaway but it's much easier to use for extended periods than Graffiti. Hardware buttons were also generally disappointing with little tactile feedback. Importantly, no hardware buttons are accessible when the NX70V's in tablet mode. MP3 playback was everything we've come to expect from a Sony, with great sound quality and a convenient remote control.

As well as the standard Memory Stick slot, the NX70V introduces a first for Sony — a CompactFlash slot. Unfortunately the only drivers available are those written by Sony to use the company's own 802.11b Wi-Fi card. The biggest downside of the NX70V is definitely its size and price. At \$1,349 and being larger and heavier than most Pocket PC devices, the NX70V will strain your pocket as well as your wallet.

Details ▶▶

OS Palm OS 5
Processor 200MHz XScale
RAM 16MB (11MB Usable)
Screen 320 x 480 x 65,535 bit
Expansion Memory Stick and (limited) CompactFlash
Battery Lithium Ion rechargeable
Contact Sony Australia
Phone 1300 137 669
Online www.sony.com.au
Price \$1,349

Verdict

- ✓ 200MHz XScale chip and Palm OS 5, in-built camera, MP3 playback.
- ✗ Largest and most expensive Palm ever, crippled CompactFlash slot, only 11MB usable RAM.



Sony Clie SJ30

The tiny Sony is little more than a screen and four buttons, giving the device roughly the proportions of Palm's compact Tungsten T (but without the magic of that model's disappearing Graffiti area). The new body shape fits extremely well in the hand without feeling undersized, but holding the PDA and using just the buttons is difficult as there's no space under the buttons.

The buttons themselves are small and slightly indented, a big improvement over previous Sony models including the higher-end T665CG and NX70V. Our only complaint here is that pressing the Up button is still slightly difficult. The SJ30 also shares the same jog dial and back button found across the Sony range. Battery life is excellent, especially when the display is set to a still-usable quarter brightness.

And it looks like the stylus from the original T615CG is here to stay, with Sony employing it on both the SJ and NX series of handhelds. Its tiny design allows Sony to keep on making smaller handhelds, but the narrowness of the barrel and light weight make extended periods of writing uncomfortable.

The SJ30 lacks the MP3 playback and enhanced speaker of previous models, as well as the enhanced infrared emitter, but this is not surprising at the entry level. Also missing is a cradle, as the Sony only comes with a combination HotSync-charger cable. While some people may miss the convenience of a desktop cradle, frequent travellers will appreciate the portability of the cable.

For \$200 less, a greyscale version of the SJ30 (the SJ20) makes a budget-minded buy. The new screen enjoys a plain white background with great contrast and high resolution. The display is a bit slow however, and exhibits streaking when running programs that require rapid updates, such as games.

Details ▶▶

OS Palm OS 4.1
Processor 33MHz Dragonball
RAM 16MB
Screen 320 x 320 x 65,535 bit
Expansion Memory Stick
Battery Lithium Ion rechargeable
Contact Sony Australia
Phone 1300 137 669
Online www.sony.com.au
Price \$449

Verdict

- ✓ Great size, feels good in the hand, high-resolution display.
- ✗ No cradle.



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Sony Clie T665CG

The T665CG is a marvel of miniaturisation. Its slim and narrow metal body holds the pepped up Dragonball 66MHz processor (which is much snappier than the 33MHz version), a built-in MP3 player and a lush high-resolution colour screen.

MP3 playback will be a big drawcard of this PDA, and the implementation is superb, rivalling — and in some cases beating — its Pocket PC brethren. Sony's long experience with consumer audio means that not only is the sound quality great, but music industry standard features like headphones, hold button and bass boost are all included. All it needs is a corded remote control.

The screen sports the same high-resolution as the SJ30, which means it's bright, evenly lit and with good colour saturation, and doesn't show any of the strong blue tinge of the T615CG's display.

What has been retained from the T615CG are the aesthetically brilliant but ergonomically disastrous hardware buttons, including the impossible up and down toggle, which will leave your thumb raw after a gaming session. The jog dial is also a bit difficult to use, being set too deeply in the side.

The weakest component of the T665CG is the battery. The 66MHz processor uses more power than the 33MHz chip favoured by most Palm OS devices; add MP3 playback and you've got a handheld with a thirst for juice. Unless the screen brightness is set to minimum, users could have to charge the Sony at least every other day — a far cry from the once a week charging regimen that most Palm owners are used to.

Considering the battery life, it's convenient that the AC charger for the cradle doubles as a travel charger when using an included adaptor. This is quite rare for the Palm and welcome for the T665CG.

Details ▶▶

OS Palm OS 4.1
Processor 66MHz Dragonball
RAM 16MB
Screen 320 x 320 x 65,535
Expansion Memory Stick
Battery Lithium Ion rechargeable
Contact Sony Australia
Phone 1300 137 669
Online www.sony.com.au
Price \$849

Verdict

- ✓ Fast 66MHz processor, great slim metal case, MP3 playback.
- ✗ Difficult to use up and down toggle, poor battery life.



Toshiba e330

This is the only Pocket PC which can match Palm OS devices for size and sheer "pocketability", which is one reason the e330 was chosen as Best Handheld of the Year in APC's 2002 Technology Awards (APC December 2002, page 112). All that detracts from the slim 12.4mm profile is the unit's width and the lack of rounded edges, which means that for people with small hands it's not as comfortable as the smallest Palms.

The e330 makes the jump from the 206MHz StrongARM processor of the earlier e310 to a 300MHz chip from Intel's PA250 XScale family. As noted in the introduction, however, there's no discernible difference between the 300MHz e330 and the 400MHz powerplants found on the Toshiba e740 and IPAQ 3970, due to the fact that the Pocket PC 2002 OS hasn't been optimised for the XScale chipsets.

What is noticeable is the battery life, which remains lower than other Pocket PCs reviewed here because of the size constraints on the rechargeable cell that were required to keep the e310 within its slim proportions. Nor is the battery replaceable. On top of the 64MB of RAM, the e330 comes with a top-mounted SD card slot which supports additional memory and accessories like a Bluetooth SD card. Sound quality from the headphone jack was superb and provided decent volume for audio playback.

All the hardware buttons have good tactile feedback; there's also a small scroll rocker for one handed operation. But we found the stylus was a little too light and finicky to remove from the silo. A more serious design flaw is the placement of the voice dictation button: it's mounted on the top left edge of the device, which is just where you'd grip the e330 when taking it out of its case.

To sum up, while the e330 has some flaws, it remains the best budget Pocket PC on the market.

Details ▶▶

OS Pocket PC 2002
Processor 300MHz XScale
RAM 64MB
Screen 240 x 320 x 16 bit
Expansion SD
Battery Lithium Ion rechargeable
Contact Toshiba
Phone 13 30 70
Online www.toshiba.com.au
Price \$899

Verdict

- ✓ The smallest and thinnest Pocket PC on the market, very competitively priced.
- ✗ Some niggling design flaws.



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Toshiba e740

Aimed squarely at the top end of the Pocket PC market, the e740 comes with a pair of expansion slots, a 400MHz XScale processor and a choice of Integrated 802.11b Wi-Fi or Bluetooth.

The dual expansion slots include a Type II CompactFlash slot, which can support IBM's Microdrive as well as conventional CF cards and accessories, and an SD slot. This means users have the choice of beefing up the storage using affordable CompactFlash cards while keeping the SD slot free for the newest SD-based accessories; or bulking up with a 256MB SD card and retaining the CF slot for accessories like an Ethernet connection or even a 56K modem card.

But the killer feature for the e740 is definitely the built-in 802.11b wireless networking. It's great to be able to access WiFi without need a bulky expansion pack or a protruding antenna. The integration of software is excellent too, and at least on par with what you'd get bundled with a third-party WiFi card.

The only component that lets down the e740 is the screen, which is the same display as on the e330, making it smaller and duller than the IPAQ 3950.

Battery life is average, but still short of the IPAQ, and activating the 802.11b radio will rapidly soak up every remaining bit of juice. The e740 works around this by making the battery user-replaceable — users can purchase multiple batteries, as well as a high-capacity cell.

If you're big on connectivity the e740m is the bee's knees; otherwise, Toshiba's e330 does pretty much everything the e740 does, in a slimmer package and at a greatly reduced price.

Details ▶▶

OS Pocket PC 2002
Processor 400MHz XScale
RAM 64MB
Screen 240 x 320 x 65,535
Expansion SD
Battery Replaceable Lithium Ion rechargeable
Contact Toshiba
Phone 13 30 70
Online www.toshiba.com.au
Price \$1,549

Verdict

- ✓ Most built-in capabilities of any Pocket PC, Wi-Fi, removable battery with high-capacity option.
- ✗ Some niggling design flaws, very expensive.



Coming soon . . .

At the time of writing, several new handhelds lay just beyond the horizon, especially on the Pocket PC platform. HP was prepping two new IPAQ models: the slim-line H1910, with its 200MHz Intel XScale chip, 64MB of RAM and a local price estimated at just under \$700, will take on Toshiba's e330 in the "budget" stakes.

At the top end of the scale, the \$1,499 H5450 will pack a 400MHz XScale processor with both Bluetooth and 802.11b Wi-Fi built in, as well as an SD card slot and a fingerprint scanner.

In the US, Dell has stepped into the handheld arena with the Axim X5. The base spec contains two processors: one with a 300MHz XScale processor and 32MB of RAM, which sells for US\$249, and a US\$349 model with a 400MHz processor and 64MB of RAM. Both have paired CF and SD card slots.

The Axim X5 isn't small but it's well priced and appointed, although at the time of writing there were no firm plans for a release on the Australian market.

Another product with a to-be-confirmed release date is Palm's Tungsten W. Despite sharing the same branding as the mighty Tungsten T, the W runs the older Palm OS 4 and slower 33MHz Dragonball processor, but is set to take on the similarly-speeded Handspring Treo with its built-in keyboard and GSM/GPRS phone capability. When the W arrives, expect it to be accompanied by a price tag around the \$1,200 mark.

Also, watch for a revamped model Zaurus SL-5600 with a 400MHz XScale chip, and 64MB of "protected" flash memory.



▶ Left to right: Hewlett-Packard's H5450 and H1910.



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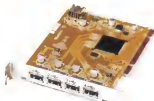
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Unmasking new threats

PC security is a whole new ball game.

The bugs are smarter and there are new ways to slip past roadblocks; viruses evade detection; spyware piggybacks inside software downloads, even your identity can be stolen online. In our special APC security report, *William Maher* and *Fiona Angus* expose the tricks and tactics used by the latest crop of digital security threats.

84 The Secure PC

86 Viruses

88 Spyware

90 Identity theft



An all-secure PC?

Can looming security technology from Microsoft, Intel and others make protecting your data any easier?

Everyone wants an easier way to protect their data. You have to constantly update virus files, hunt for software patches, fine-tune firewall settings — and after all that, a new rogue virus still manages to sneak past your defences and ruins everything.

Now the industry is trying to win back confidence in PC security. Under the banner of "Trusted Computing", hardware and software vendors are proposing to turn the PC into a digital vault, complete with encryption chips and ID certificates. But will users be reassured, or are more day-to-day threats simply unavoidable?

Recent events have seen data security greatly escalate in importance. Since September 11, 2001, the security rhetoric has been ratcheted up a notch with antivirus software companies, like Symantec, advising governments in the US and Australia on the need to increase protection. \$24.9 million was allocated to IT infrastructure security in the last Federal budget, including a national alert scheme for viruses and hack attacks.

The not-so-small secret is that despite all this time and money spent guarding against unseen nasties, there's little reason to feel safe. Computers are under constant threat from new angles; increasing numbers of viruses now attack via email, network

sharing, instant messaging and peer-to-peer networks. Once inside your PC, these enemies pose a greater danger than ever, with worms like Bugbear and Klez (see page 86) threatening to expose your hard drive to the Internet.

The stakes are rising. Spyware is finding its way into popular applications, despite efforts to outlaw the intrusive software (see page 88). Bugs in popular software now expose millions of people to potentially critical security holes — including major vulnerabilities discovered

in Microsoft's Internet Explorer. Serious outbreaks now spread rapidly, recently attacking several of the Internet's root DNS servers.

The 2002 Australian Computer Crime and Security Survey provides damning evidence that even at the big end of town, which can't afford to take viruses lightly, there's little suggestion that things are getting better. "Despite a relatively high uptake of fundamental security technologies (passwords, firewalls, antivirus software), serious computer network attacks continue to occur," states the report.

Although 99% of respondents to the survey used antivirus software, 76% reported they had been infected by viruses, worms or trojans and 43% reported financial losses as a result. If these people



— drawn from BRW's list of top 300 Australian companies — can't find a bulletproof antivirus solution, what hope is there for the rest of us?

"Trust is not in high supply on the Internet generally and in electronic environments," says Charles Britton of the Australian Consumers' Association (ACA). He argues that people are being treated unfairly by security solutions that promise everything but take none of the responsibility when things go wrong.

Take Public Key Encryption technology. The consumer has 100% responsibility for securing the matching private key. If a trojan horse pinches your private key, that's entirely your problem.

WOULD YOU TRUST BIG BROTHER?

Microsoft, Intel, AMD and others promise a future in which embedded security in the basic components of the PC — the CPU, operating system and applications — will allow the machine itself to start watching out for you.

This will mean trusting the sorts of Big Brother-style technologies that most PC owners have run a mile from in the past. For example, Intel is reintroducing security into the CPU chipset.

A new version of the Pentium 4 will include technology called LaGrande which places a "secure wrapper" around selected hard drive data. The chip is code-named Prescott and will debut in the second half of this year.

Prescott is only the beginning. One by one, hardware and software will be embedded with the ability to connect to a security mesh that vets everything running on your PC. Microsoft has coined its application of the concept "Palladium", though the idea comes from the broader Trusted Computing Platform Alliance (TCPA), which has already seen IBM incorporate encryption chips into its ThinkPad T30 notebooks.

Palladium has a number of components, which will likely include:

- A new version of Windows with a security kernel to establish whether applications and data can be trusted
- Hardware with digital ID which must be authenticated before being given access to secure area

Hardware and software vendors are proposing to turn our PCs into digital vaults, complete with encryption chips and ID certificates

- New APIs (Application Program Interfaces) to allow programs to be written to take advantage of trusted space. "Trusted agents" are applications that are given the all-clear by Windows to operate in a secured area and access secured data
- A new security chip on the motherboard storing a private master key required for access to the secure area

Software and hardware must be trusted by your PC to get anywhere near your secure data, held in a kind of virtual sandbox. The sandbox is quarantined from the rest of the PC, so a virus infecting the non-secure part of the computer can't affect protected data. Stored data will be encrypted and will only be decrypted by authenticated programs.

FROM PC TO APPLIANCE

The master key will be stored in hardware, preventing theft by trojan viruses. Importantly, it's all optional. Systems will be shipped with security turned off. Any unauthorised code can still be run in non-secure areas of Windows.

The overall effect is like turning the PC into an appliance or a black box argues Matt Barrie, a security consultant who teaches data protection at the University of Sydney. "What they are trying to do is produce a box whereby you don't have full access to your machine. You only have the right to play things on it. It's like a DVD player."

Interestingly, Microsoft already has a machine available that operates under the same concept — the Xbox games console. The console itself is a small computer with off-the-shelf PC hardware such as a Pentium III processor and hard drive. A huge amount of effort has been spent embedding encryption and protection schemes, including crypto chips that check to make sure games have been digitally signed. "The Xbox is really putting the toes in the water for the birth of Palladium and the birth of the TPCA," says Barrie.

But, as Microsoft has already discovered, black boxes don't sit well with PC users who are used to having a free reign over data. With the Xbox, gamers inevitably broke the rules, modifying the machine with chips so they could play unauthorised games and even install the Linux OS.

Barrie argues that Trusted Computing PCs will pose the same problem in the future. "You will not have full access to your box," he says. "You will not have root access or administrator access to your machine. Furthermore, you will not be allowed to pull it apart and tinker with it — that would be illegal [under US anti-reverse engineering laws]. If you want to use StarOffice running Linux, you mightn't be able to do that because Linux might not be certified."

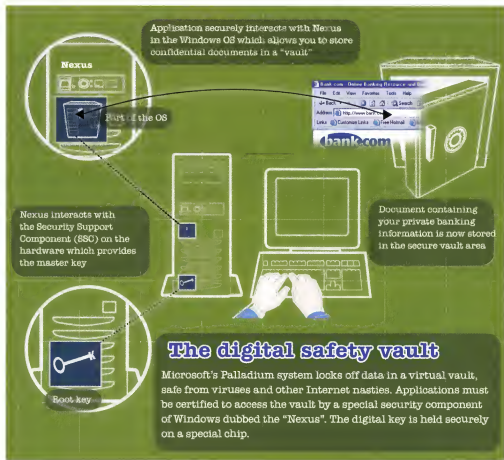
It's changing the whole shape of desktop computing and the way we consume digital applications, games, audio and video. It's really pretty scary stuff."

Therein lies the problem. The PC is a *personal* computer; it doesn't like being tied down with encryption and security. It's beauty is that the PC is whatever you want it to be. It's not an Xbox, or a PlayStation, or a DVD player.

Despite PC owners' increasingly large bag of fighting tools, there are just too many bugs for viruses to exploit. A lot of spyware is built-in to commercial applications, which could potentially be digitally signed to run on Palladium systems in the future. It's a race just to keep up, with an ever-increasing number of patches and fixes; 25 new virus fixes are created every day, according to antivirus vendor or Sophos.

The problem for Microsoft and the thousands of computer users waiting for a cure is that security can't be seen, felt or touched. Install a patch and when you're done your machine just sits there, quietly humming away exactly as it did before. To the casual user there's nothing to prove they are less vulnerable than they were five minutes earlier. Microsoft claims that Palladium will end this doubt, but it will be years before all the pieces are in place.

Despite so much new technology, the only sure-fire way of solving the problem is pulling the phone line or network cable from your PC. Meanwhile, as the following pages reveal, the traditional 'break and enter' enemies of your PC are refining their attack strategies with ever-smarter ways to defeat your defences.



Meet the superbugs

We go inside an antivirus lab to show you how

increasingly nasty viruses attack.

In mid-to late-2001, two worms — dubbed Nimda and Code Red — exploded like fast-growing weeds over the Internet, hammering PCs and Web servers, causing sites to crash and email systems to chug to a crawl. They were beyond Melissa, The LoveBug and the array of viruses that made the nightly news with alarming regularity. No-one has looked at email the same way since.

But now the stakes are higher while we lie in wait for the next outbreak. Since Christmas, many small Australian businesses have been required to comply with new Privacy Act rules, making the prospect of losing confidential data a real concern. At the same time a new breed of viruses is threatening to do just that — spread the contents of your hard drive across the Net.

One of the he worst culprits in recent times is Bugbear. "That was the first very widespread virus that should have rung alarm bells for people," says Paul Ducklin, head of global support for antivirus software company Sophos. "It was the first virus that leaked information on this sort of scale."

The virus, or worm, accounted for more than 75% of virus reports sent to the Sophos help desk last October.

Bugbear was spread by email as well as via shared network drives, and opened a backdoor that potentially allowed Internet users to browse hard drives and execute programs.

Similar tricks were used by Klez, a mass-emailing virus which attempted to disable antivirus software and send out random files taken from the infected PC. While Klez spreads via the Internet, it also unleashes a tag team partner called the Elkern virus, which compounds damage by automatically spreading within networks.

More of these viruses are appearing every day. Today's overall virus tally from Sophos is at 78,000, and for every worm in the monthly "Top Ten" list there are another 200 you'll never hear about.

Researchers come up with antidotes for 25 new viruses each day, but are they fighting a losing battle?

"Everyone is saying everything's getting worse because there are many more viruses and the viruses are bigger and better and nastier," Ducklin says. "But in 1988 the Internet worm hit — the Internet was much smaller, but it actually zapped about 25% of the Internet as it was then. That was traumatic. It was like the end of the Internet for the weekend."

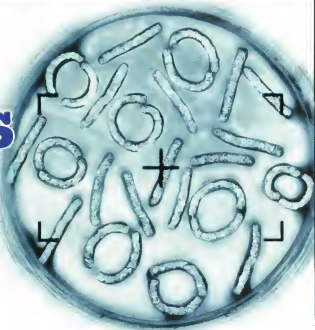
While today's viruses aren't likely to shut down the Net, they are still causing major headaches worming their way into machines via email, and attacking via chat software (the Coolnow worm targets Windows Messenger), IRC and peer-to-peer file sharing networks.

What many don't realise is that disinfecting these viruses isn't always effective. For example, the CodeRed II variant leaves behind an innocuous DLL which mightn't be detected by virus checkers. The infiltrator lies dormant but provides an open entryway for the Nimda virus.

This tag team approach is being copied by many viruses. Delete only Klez and you've missed its network-spreading partner Elkern, and a key logging DLL file.

"Once you've been infected, all bets are off," Ducklin explains, "you should not assume that having an antivirus with an 'automagic' button will keep you safe."

Finding these extra nuggets left behind by viruses is requiring more effort. And these "hybrids" or "blended threats" are employing



Virus hitlist

Klez: Not only spreads via email address books, but can target companies in network-style attacks, and attempts to disable antivirus software and delete files. Most widely reported virus in 2002.

Slapper: Linux worm that only targets Apache Web servers. Once active, the worm can be used as a backdoor to start up a range of denial-of-service attacks.

Magistr: Polymorphic virus that "morphs" to evade detection. Can delete all files from local and network drives, wipe CMOS settings and flash the BIOS chip of your computer.

Coolnow: Targets instant messaging users. When a Web page is viewed by a vulnerable user the worm will send a message to all the user's MSN Messenger contacts. The message will ask the recipient to visit the affected Web page.

SQLSpider: Attacks computers running Microsoft SQL Server with blank "so" (system administrator) passwords. Copies itself to the shared drive, odds guest accounts and records IP configuration and password hashes, sending them to the virus writer via email.



Protect your PC from viruses with McAfee Virus Scan 7 on this month's cover CD.

Today's
virus tally
from Sophos is
at 78,000, with 25
antidotes created
daily.

tricks to make it harder for researchers to discover their inner workings. At the top end of the crafty scale are polymorphic viruses. Like something from the cyberpunk world of William Gibson's *Neuromancer*, in an attempt to evade detection by antivirus software, these shapeshifters mutate each time they infect a PC.

Simply recognising the alien code doesn't work; someone must discover how the virus mutates by unlocking its doors — breaking open the special encryption algorithm used to scramble the virus. It's a painstaking jumble of mutated encryptors, loop counters and algorithm engines.

In the race to get a fix ready, virus writers hope something will be missed. With polymorphic viruses, only one undetected mutation is needed for a whole new outbreak to reoccur.

"It's like myxomatosis in rabbits. The idea is to complicate our detection and analysis, and to frustrate our efforts to prevent it reliably," Ducklin says. The most common strains, like the Bugbear worm, don't contain any scrambling techniques and are easy to detect.

Still, new tricks are always being tested. Along the way, writers have tried infecting spreadsheets, database files, Word documents, PDFs and Shockwave Flash animations. Not everything works. Once someone sent a CD to Sophos containing 15,000 new variants. Because they were all created using a virus "toolkit" only a small update was needed for antivirus protection.

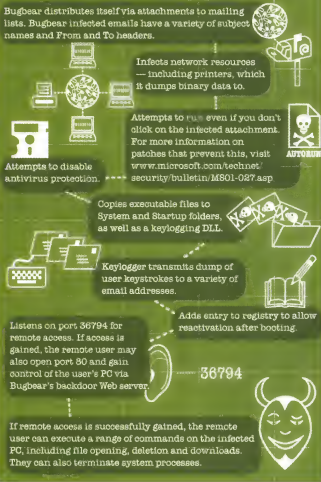
But with continual outbreaks, is antivirus protection working? Ducklin argues that in the past, most viruses were reported when computers were infected. Now he says that reports mostly come from those who have thwarted viruses with antivirus software. The number of major outbreaks each year can be counted on both hands. "Sometimes I think the antivirus industry doesn't get credit where it deserves it," he says. "They go 'oh look, Bugbear happened!'. Well no, we had prevention really quickly and people are still clicking on that attachment even though they know it's bogus."

The ultimate way to get viruses out of the way is to discourage their writing in the first place — ISPs are now more willing to help prosecute virus writers — but until all are in jail or hackers move onto other games, the problem will persist. With more software bugs being discovered, there's an ample supply of vulnerable PCs left to target.

You can be sure that the next major outbreak is only down the road, and who knows what tricks it will employ?

The Bugbear virus — don't fall for it

Backdoors, keylogging, antivirus deactivation — this nasty super-virus has it all. Here's how Bugbear launches an all-out attack on your PC.



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The devil inside

Why spyware is taking over your computer, and why outlawing these Net pests is proving difficult.

The signs are ominous. For no apparent reason, your computer keeps trying to dial the Internet. Your home page keeps changing. Mysterious pop-up advertising keeps appearing out of the blue. You get the feeling that while you are online someone, or something, is watching you.

Chances are you may be infected with spyware—software that worms its way inside your PC like a virus, piggybacking its way under commercial applications and hidden inside downloads. Often you don't know it's there, hiding amongst your applications while it does its dirty work.

Some of the biggest players on the Net have been allegedly caught using spyware, including the likes of RealNetworks, Audiogalaxy and Netscape. However, efforts to eliminate these wolves in sheep's clothing haven't been successful. The industry has put up a wall, frustrating efforts to remove spyware with legal threats and denials, while millions are affected—like when a hidden program appeared in the

popular file sharing tool

KaZaA.

New hope emerged recently when AOL/ Netscape lost a court appeal to prevent being investigated for violating

US Electronic Communications Privacy and Computer

Fraud and Abuse Acts with alleged spyware. A class action begun in 2000 alleged that the "SmartDownload" feature in Netscape Communicator was secretly transmitting file download information to Netscape and America Online.

Soon after the suit, Netscape was

modified to cease collection of any identifying tags. However, the battle didn't end there. While the latest appeal ruling gives new hope that a precedent can be set against big commercial software vendors, the battle to prove the existence of the problem has been difficult.

TAKING ON BIG BUSINESS

At the forefront of the vendors' wrath is US security analyst and software writer Steve Gibson. For some time he was maintaining a page of "suspected spyware" on the Internet. The plan was to find time to do additional research into the specifics of each company's offerings. But until then, Gibson wanted to have some clearing house where "suspicious" products could be grouped.

The move got him into serious trouble. One by one every company on the hitlist showed up to threaten legal action if he didn't remove any reference to them in connection with the term "spyware".

"Having been in business and around the block a few times, I capitulated in every instance without hesitation," Gibson explains. "And I apologised for any trouble they had been caused. In this distressingly litigious country of ours, where defendants bear all of the expense for even nominally frivolous lawsuits, there's good reason not to annoy Goliaths."

Gibson shut down his own work on anti-spyware freeware OptOut and instead formally endorsed LavaSoft's Ad-Aware solution. Ad-Aware is based in Europe, making it much more difficult for vendors to sue.

Meanwhile, companies continue to hide



Spyware hitlist

Blackstone Data Transponder: Distributed with the likes of Audiogalaxy and iMesh. Monitors your browsing and collects form information—including SSL encrypted data—you submit online, and transmits it back to the company.

KaZaA: Installs CyDoor and Brilliant Digital, which transmits user details and online movements to the host server and generates pop-up advertising. Also includes the Altnet distributed computing model, which allows KaZaA to use your spare bandwidth, storage and processing power.

Xupiter/Lop.com: Changes default homepage, and keeps reinstating it after being removed. Erroneous sites get redirected to company homepage. Part of sub-class of spyware known as "hijackware".

Gator: Tracks and reports user movements, shows pop-up ads, and now includes "drive-by downloading", where pop-up ads attempt to execute software on your PC.

Cytron: It takes the form of a counterfeit ecard from a trusted outlet, such as Yahoo. If the user permits installation, pornographic pop-up advertisements open on the user's desktop while browsing.



On this month's cover CD your personal anti-spyware toolkit—including Ad-aware and ZoneAlarm.

"... with trojan horses there's a whole spectrum. There are multiple grey areas."

spying tools inside popular applications. In some ways nothing inspires the hatred of Net users more, even viruses. Viruses at least make no bones about doing damage to PCs. Spyware on the other hand, infiltrates your PC without your knowledge, then tries to cosy up to you, flinging a barrage of pop-up ads, or direct you to a new homepage as if to say, "Sorry about surprising you like that, here's some advertising I thought you'd like."

The problem hit the international spotlight with peer-to-peer music and video sharing tool KaZaA. With Napster in its death throes, millions were installing KaZaA in their quest to share music and movies. What they didn't realise is that the software's makers had quietly embedded the ability to turn the millions of computers with KaZaA installed into an advertising network. The software was dormant, but when turned on, KaZaA makers Brilliant Digital planned to use the processing power and Internet connections of the machines to host and distribute other companies' content, such as advertising or music — with the owner's permission of course.

In 1999 RealNetworks tagged its free RealPlayer with a unique user identification number. Every time you listened to music, whether off the Internet or from your CD collection, RealAudio player would query the RealAudio database to provide song title information. Embedded in the encrypted query were details of what you were listening to, what music files you had on your computer and what music you downloaded from the Web. All of this identification, together with the unique identification number, was stored by RealAudio in a database.

LEGITIMATE SOFTWARE

Unlike viruses, spyware can sometimes be classified as legitimate software. It's often installed with commercial applications and might be found buried in the legal fine print, though many times you are given no warning. Also, spyware has a specific function, usually tracking your movements online.

Companies can use the information to market things to you. It can also be sold to other marketers. Some free programs just display ads and

use your Internet connection to download new ads. This "adware" may be annoying, but it's not necessarily spyware. It only qualifies as spyware if it sends data back to somebody.

Unlike viruses, spyware isn't always designed to wreak damage to your PC, though that often happens. Poorly written "diallers" fail, and then keep trying to reconnect to the Net, or send data while you are already online. This can cause an enormous amount of nonsense traffic on corporate networks, and any TCP/IP LAN that doesn't have an Internet connection.

For example, as APC has warned before, the Save Now application which comes with BearShare and GoZilla causes Internet Explorer to crash with invalid page faults or illegal operations, effectively preventing you from using your system normally.

Gibson sees a real distinction between commercial intrusive software of any kind, such as KaZaA and Netscape, and non-commercial virus-like trojans which simply piggybacks on anything it can find. This difference is frustrating efforts to outlaw the problem.

Many antivirus vendors say they can't target spyware in the same way as viruses, because it's not clear what is and isn't classified as malicious. "There's a wobbly grey line here. Really the people you want to complain to are the people who wrote these programs," says Paul Ducklin, of antivirus vendor Sophos.

"Viruses are easy. They are automatically guilty of unauthorised access and alteration of data. Quite clearly these are classified as crimes. But with trojan horses, there's a whole spectrum. There are multiple grey areas," Ducklin says.

Charles Britton, of the Australian Consumer Association (ACA), says PC owners may have some rights to fall back on, such as the Cybercrimes Act, or privacy authorities. However, he points out you'll need to get your hands on the culprit, who is unlikely to be in the country.

The best policy for avoiding spyware is to be careful about everything you download, never click on strange email attachments and always read the fine print when installing software, says Britton, adding "but who does?"

Inside spyware's dirty tricks

-
1. Installs new.net spyware. Warning provided.
 2. In accordance with its EULA ("click to accept" user agreement), Radlight spyware is deleted and anti-spyware tool Ad-Aware from your system.
 3. Registers the NEW! UPDATE DLL as a Layered Service Protocol (LSP) on your machine. Requests for external online access get filtered through it. If you manually delete the URL, online access is disabled.
 4. Transmits a unique ID from your PC to new.net's update server and a sponsored pop-up search engine called Firstlook.
 5. Creates new browser windows featuring advertisements relating to new.net's domain name service and Firstlook search engine while you browse.
 6. Installs SaveNow. Registers itself to run at startup independently of Radlight. Warning provided.
 7. Collects form details that you may submit online, including personal details and movements online.
 8. Displays pop-up advertisements while you browse, based on your online movements.
 9. Both new.net and SaveNow spyware do lead to system instability, due to incompatibility with legitimate applications. Microsoft has a page devoted to the issue and possible remedies at <http://support.microsoft.com/default.aspx?scid=KB;en-us;q304663>
 10. Radlight 3.03 DVX player: Not just a DVX movie player, but a gateway for spyware into your PC.

Identity theft

You can run but you can't hide from the fastest growing crime on the Net.

The mysterious charges were listed as "Internet-related" and originated from somewhere in the US. If Simon (not his real name) hadn't been in the habit of cross-checking his credit card statements, he may have paid the extra \$40 without question. While the bank launched an investigation and eventually reversed the charges, Simon never discovered who tried to impersonate him.

Identity theft has become one of the fastest growing crimes thanks to the way personal details are traded over the Internet. KPMG's Fraud Survey 2002 found half of all fraud involved stolen and faked credit card numbers. Research by US firm Celent Communications found identity theft is now the fastest growing white-collar crime, with other estimates suggesting one in four US adults have had their financial details stolen.

New forms of identity theft are emerging, according to Linda Foley, the head of a victim support group called the Identity Theft Resource Centre. "It is growing quickly because of the ease in doing it, the high profit and the low risk," says

Foley, US estimates suggest less than 5% of offenders are arrested.

The old crime of impersonating someone else in order to claim money and services has exploded since the Net opened new opportunities for thieves capable of searching or intercepting

digitised personal information. "A Peep can be

anyone needing or wanting money," she says.

But what makes the new era of identity theft so scary is there's no way to stop it happening to you. Foley is blunt: "You cannot protect yourself, but you can minimise your risk."

The sheer scale of the crime is partly due to the much lower standard of identity verification used on the Net. The one thing stopping identity

theft growing in Australia to the levels seen in the US is our resistance to a single ID number. The US Social Security Number is used for too many different purposes, according to the director of the Privacy Rights Clearinghouse, Beth Givens. "Here [in the US] it has been appropriated for use as the identification number for financial services. Therein lies the bulk of the problem."

VERIFYING A DIGITAL IDENTITY

There are three methods of verifying someone's identity explains Gregg Rowley, managing director of security firm VeriSign Australia: "Something that you know, something that you have or something that you are." He designs digital authentication systems for public and private networks using combinations of the three layers. Internet transactions are usually based purely on information you "know". "Passwords are notoriously easy for people to break," he says. The next layer requires you to have a physical form of ID such as a card. The online equivalent of an ID card is a digital certificate. While a thief can copy the file to disk or hack into the PC (or even unscramble the cryptographic module), it's a lot harder than guessing a password.

"The degree of security you use depends on the size of the threat and the potential loss," Rowley says. The ultimate form of identity verification is a biometric measurement, which registers who you "are". Verisign uses hand geometry in its local centre while the Federal Government is investigating building a biometric identifier into all passports that records your facial features on a magnetic strip.



Spoofing and aliases

Impersonating well-known Web sites and email spoofing can be lucrative scams for identity thieves. Everyday email (over SMTP) doesn't require authentication of the sender so thieves can easily disguise the header. They can pretend to be your bank manager and trick you into confirming account numbers, or impersonate your system administrator and ask you to change your password. In November, The Australian Competition and Consumer Commission took court action against www.sydneyopera.org after several consumers from Europe allegedly tried to buy tickets from the overseas-hosted site that never arrived. If an email or Web site asks for personal information, check the header properties for suspicious addresses and verify your Web sessions are encrypted in your browser menu. Double-check the physical contact details and privacy and security policies of anyone requesting personal details. Always use an alias (using an anonymous Webmail address) in unknown Internet territory such as chat rooms and forums, making sure your browser is configured to its highest security setting.

You may never really discover how and who is brokering your information across the

Net

INSIDERS SUBVERTING THE SYSTEM

The way personal information is now collected and handled by companies has made it impossible for even the most paranoid cryptographer to fully protect their identity. Late last year, the FBI uncovered what is thought to be the largest case of identity theft in the world. An organised gang allegedly used the personal details of 30,000 customers from three financial institutions to steal millions. The key accused was a helpdesk worker with access to sensitive data and passwords.

KPMG's Fraud Survey found 60% of fraud is perpetrated by "insiders" who are able to subvert the system. Employees are able to take codes and access valuable corporate databases from a remote location, making the attack look like a hacker based overseas. Before the Net, mainframes restricted access, but some newer systems can be managed remotely with nothing more than a password.

Businesses are required to keep your information secure under the new privacy regulations that came into effect in December 2001. The laws also give you the power to find out what information they know, who they plan to give it to, why they want it and whether they're using it for the purpose they collected it for (you can also correct inaccurate information and request not to receive marketing). However, of the 602 complaints made to the Office of the Federal Privacy Commissioner in the following year, 7% related to security and almost 25% concerned improper disclosure.

Irene Graham is executive director of civil liberties group Electronic Frontiers Australia (EFA). She believes that while it's important to have clear privacy laws, the current regulations contain too many exemptions and contested definitions. Several loopholes allow companies the freedom to gather sensitive personal data in ways you may not expect.

When it comes to safeguarding your identity, the use of cookies, Web crawling and database mining is raising concerns. Companies are only required to tell you in general terms how they collect personal information (i.e., the electoral roll, cookies and direct marketing lists) rather than specifically how they tracked you down. Federal Privacy Commissioner, Malcolm Crompton, states: "We think that it would be good privacy practice to tell people in detail from where information about them has been sourced." But the bottom line is you may never really discover the true extent of how and who is brokering your information across the Net.

New technology is often developed with little thought to how it can be used to invade privacy, says EFA's Irene Graham. "We think software developers should pay more attention to having privacy protection mechanisms built-in," she says. The EFA is hoping the Privacy Act will be tightened when it comes up for review at the end of the year. She argues policy, technology and awareness are all important elements for protecting privacy. "The bigger the database and the more information in them, the more people are at risk of privacy infringement and identity theft," she says. "If they do get broken into, rather than getting a couple of pieces of information about individuals, they get access to everything." ■■■

VALUABLE INFORMATION

- Full Name (including prior names and mother's maiden name)
- Address, phone and email contacts
- Driver's licence Number
- Tax File Number
- Medicare Number
- Passport Number
- Credit and Bank account numbers
- School and University Student Number
- Online auction account details
- Online job accounts

WHAT THEY CAN STEAL

- One-off credit card purchases
- Open a credit card account and spend to the limit of the account
- Healthcare benefits and prescriptions
- Mobile phone and Internet accounts
- Centrelink services
- Car rego
- Criminal record
- Citizenship status or work entitlements
- Education and training services

Security versus privacy

The spectre of Big Brother hovers over emerging technology and efforts to secure networks against identity thieves, says Malcolm Crompton.

Identity theft and the measures being put in place to combat it have become an issue of importance for the Office of the Federal Privacy Commissioner. While at this stage calls and complaints to the Office about identity theft have been relatively low, the Office has been involved in thinking through and working with organisations and government and urging them to respect privacy while aiming to combat identification fraud.

When dealing with identity fraud, it is important to remember that it is essentially an organised crime activity. Most large scale identity fraud is committed by skilled criminals associated with organised crime. Security, therefore, is a major issue in the prevention of identity fraud. The security measures that are often suggested as possible remedies for identity theft have the potential to be very privacy invasive.

Measures that sometimes get floated include the collection of as much data as possible about transactions of a particular kind, over long periods, with the aim of finding patterns that will help to detect which transactions are fraudulent and which are legitimate. This could mean a lot of extra information, such as our address, contact numbers and a detailed list of transactional information, would be collected, stored and analysed by companies and law enforcement bodies.

Another suggestion is for stronger identification measures to be put in place. These suggestions at their most extreme could involve a cradle to grave universal identity card or system where babies are tagged with a biometric (for example, fingerprint, iris scan, DNA sample) to identify them, and that biometric is then attached to an identity card. Solutions such as these appear to have ignored developments in technology and have avoided proper analysis of the problems in ways that seek to find security solutions which are much less invasive. Developers of these solutions seemingly haven't considered which problems require identification, which require authentication and which merely require irrevocable authentication. One card with one number for one person in all circumstances is not the answer. This is an outdated response that has the potential to be privacy invasive.

New technologies which have one unique identifier, used in a whole range of contexts, and then link a range of information for example, to look for patterns, create significant privacy risks. Identity authentication systems that do not require the authenticating body to hold large amounts of information about an individual, where the individual knowingly exercises a choice to enrol in the system, pose less risk to privacy.

In finding an appropriate balance between privacy and accountability, it may be helpful to distinguish between circumstances where full identification is required and those where only authorisation is needed. An important key in developing privacy enhancing technologies will be determining when knowledge of a person's identity is necessary and when it is not, and then building systems that can separate the two.

Malcolm Crompton is the Federal Privacy Commissioner. For Australia's Ten National Privacy Principles, go to www.privacy.gov.au



Nobody likes getting conned. But that's exactly how many CEOs are feeling after waking from a year-long dream state in which technology vendors and information technology managers convinced them to spend millions on IT initiatives that went nowhere.

Carefree spending on IT is a thing of the past. Economic uncertainty and market pressures have forced companies to take a hard look at their past IT investments, often to find that they've fallen short of the stellar return on investment (ROI) once promised by keen software vendors. IT budgets have been slashed as once technophilic executives put IT spending into idle and demand greater tech accountability.

Consider Pillar, a superannuation funds administrator handling the investment portfolios of more than 700,000 clients. In the past two years, Pillar's IT budget has been slashed by around 30%, undoing the spending increase that had come from Millennium Bug preparations several years

ago. That investment was followed by a significant push towards ebusiness, but now money is tight and there's little left for new IT initiatives. "We have put off some of the hardware purchases we would have done, and made do for longer than we would necessarily have done in the good times," says Peter Dowd, Pillar's general manager of information technology.

Pillar's next upgrade will be a refresh to its mid-range servers, and the organisation may install a storage area network (SAN) down the road. But for now, IT spending remains low.

"Quite a few promises made during the dot com boom have come back to haunt IT," says Dowd. "I don't think [the budget] will go down much more, but it's pretty flat. And I can't see what's going to drive any sort of major expansion. In our company or any company, but a better economic environment.

The IT budget SQUEEZE

The era of the IT spending frenzy is over. David Braue investigates the frugal new world of the business IT budget and how, despite the apparent gloom, it's not all bad news for the IT sector.



The focus is now very much on the business, and what IT can deliver to the business."

COUNTING THE COST OF THE IT COLLAPSE

Decision makers have every right to be demanding value. Although IT is the backbone of modern business, in retrospect it's becoming clear just how much vendors played on customers' fears of being non-competitive.

Broadly scoped enterprise resource planning (ERP), supply chain management (SCM) and customer relationship management (CRM) systems were sold on grandiose ROI promises and the unspoken threat that anybody who didn't buy one would be steamrolled by competitors who did. Vendors were selling through fearmongering, and often forgetting to deliver real value in the rush to sign up customers.

Widespread promotion of IT's merits created an entire ecosystem of

vendors, consultants and hardware suppliers that locked customers into ongoing investments in major information systems. Business cases were typically based on three-, four-, or five-year ROI—but as those periods now come to a close, a growing number of executives have been disappointed.

Unrealised technology promises have soured many executives on the whole concept of heavy IT purchasing. Still others are throttling back after overspending on servers, storage and infrastructure that's proved to be far too much for the companies' current needs. Instead, money that might normally have gone into IT is being diverted to other business units or used to shore up scant profits.

IT conservatism has hit PC sales particularly hard, since more and more businesses have decided they can keep their current systems for a little longer. Other segments of the market have also suffered as vendors realised they'd come to a point where they





▶ **Haunting:** Pillar's Peter Dowd says some promises made during the dot com boom "have come back to haunt IT."

simply had no new value to add. "In a lot of cases, organisations have got quite complex architectures in place, and have a lot of components that don't work together that well,"

"Right now it is a buyer's market and we've been able to take advantage of that. It's enabled us to have more IT employees but slash our contractor base"

says Brooke Galloway, research director with IDC Australia.

"In response to the challenging environment, they're looking at that underlying infrastructure to see how they can consolidate it, get some efficiency and improve the effectiveness of their existing investments."

That business might get smarter about its IT spending was a nightmare scenario for vendors, who had become accustomed to IT's halcyon days in the rush to escape the ravages of the Millennium Bug. The effects of this slowdown were most strongly felt during 2001, when Gartner Dataquest reports that Asia-Pacific telecommunications purchases increased just 0.5%, hardware a measly 0.6% and software just 1.5%. Overall, this translated into a paltry 1.4% growth rate.

Such numbers are far from the heady days of double-digit growth that was both fuelled — and resulted from — unquenchable demand for technology during the late 1990s. Even in the few areas where purchasing has continued unabated, such as storage, revenues are down because prices have dropped so quickly.

THE UPSIDE: CHEAPER IT LABOUR

Businesses have, however, benefited from the slowdown in one way: skilled IT workers are cheaper to come by. With hundreds of Australian IT workers laid off in a series of staff cuts late last year, it's a great time to pick up IT skills at prices far more reasonable than those commanded several years ago.

Pillar took advantage of the buyer's market to pick up many IT workers while jettisoning higher-paid contractors. Previously, over one-third of the company's IT workers were contractors; these days, that proportion has shrunk to less than 10%.

"The overall cost of employing people has gone down considerably," says Dowd. "Before, you had to take what you could get. Right now it is a buyer's market and we've been able to take advantage of that. It's enabled us to have more IT employees but slash our contractor base."

Companies that build out their skills will be

returns, will make or break the project's chances of ever getting off the ground.

When projects do go ahead, business executives expect results within timeframes that would have been laughable a few years ago. Ninety-day projects are ideal, and six months is generally acceptable. But try to stretch a project 12 months or beyond, and you may well find the board showing you the door.

Recognising the pressure that IT managers are under, some vendors back their products with guarantees that they'll be implemented within a set time period. If the company you want to buy from doesn't offer such a deal, ask them anyway; they may be able to work something out.

Making a commitment, in writing, to deployment within a certain time can go a long way towards opening the minds and wallets of sceptical executives.

Fortunately, there are a number of ways to make IT business cases more appealing. First and foremost, build the case in terms that set realistic goals and a reasonable timeframe for completion of the project. Don't push the expected project to the end of your window of opportunity, and always allow time for mistakes: there will inevitably be slip-ups that delay your project by a few days or weeks.

If it looks like a particular system will take too long to get running, try to break the project into smaller, more manageable chunks. For example, if you ultimately want to upgrade

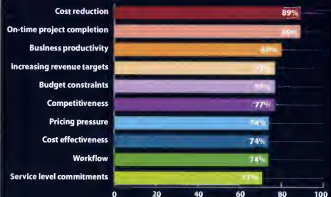
better positioned to manage more complex projects when the long-awaited budget recovery happens. In the meantime, IT planners — and SMEs for whom IT is now coming a distant second priority to keeping the business afloat — need to radically rethink their IT strategies.

STRUCTURE THE PROJECT FOR SUCCESS...

With budgets down across the board, IT strategists must justify every penny that goes into technology. Regardless of its intended audience, the strength of the business case, and the project's potential

Major business and IT issues

A recent survey of information executives showed a major focus on getting the job done right, quickly and cost effectively. Their major concerns, as a percentage of respondents, were:



Source: Gartner and Mercury Interactive, September 2002 survey of 40 Asia-Pacific chief information officers.

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your desktop PCs and install a new accounting package, consider managing the upgrade first and separately.

However, even a seemingly simple task like a desktop refresh can blow out. You'll discover that it takes longer than expected to inventory what you already have, earmark the systems needing replacement, choose the new supplier, settle on specifications, source the systems and plan the system swap to minimise interruption to staff.

Once you've completed that part of the project and reached your first milestone, then you can worry about installing the accounting package, which will have its own idiosyncrasies. By being careful not to overcommit your time (or your company's funds) it's much easier to report successful outcomes and get management backing for the next stage.

...OR JUST APPEAL TO THE BOSS' SENSIBILITIES

There are a few areas of IT spending that refuses to die however, and storage and security top the list. Storage is always important because companies are generating ever larger volumes of data that needs to be managed. And security has topped the list of corporate spending priorities in the wake of September 11. If you paint a project in terms of the security benefits it

provides, you're likely to get a few friendly ears right from the start.

"In terms of the initiatives companies are going to focus on first, we see security as being one of the big ones," says Daniel McHugh, Asia-Pacific research analyst for IT trends with Gartner. "Many companies are giving lip-service to this technology, and [most have] very simple-style security, not really in the realm of real integrated security solutions. That's why they see value in security."

"There's also an interest in things like business intelligence and knowledge management, which are starting to come back into their own."

One button that will always get the right attention is cost cutting. Although it can be a major effort, it's worth addressing costs by

Asia-Pacific end user spending on IT by technology segment (millions of US dollars)

	2001	2002	2003
Hardware	37,213	38,567	40,949
Annual growth (%)	0.6	3.6	6.2
Software	5,118	5,452	5,843
Annual growth (%)	1.5	6.5	7.2
IT services	28,388	31,285	35,135
Annual growth (%)	8.4	10.2	12.3
Telecom	174,071	183,618	202,703
Annual growth (%)	0.5	5.5	10.4
Total market	244,790	258,922	284,630
Annual growth (%)	1.4	5.8	9.9

Source: Gartner Dataquest (September 2002)

revisiting your licensing strategies — particularly in terms of desktop PCs where recurring licensing fees are consuming an increasing proportion of corporate IT budgets. Microsoft is the worst offender, having lost a lot of friends after its Licensing 6.0 program increased the cost of some companies' key software.

Since then, interest in the free Linux

Prioritising IT spending for the best ROI

No matter how an IT project is justified, getting executives to prise open the chequebook is going to require an excellent case for business ROI. In Gartner and Mercury Interactive's recent survey of Asia-Pacific CIOs, 97% of respondents said it was important for IT projects to show a ROI.

Just how that ROI is to be measured, however, is not immediately clear. Fully 97% of respondents said it was important or very important to measure the performance of their IT systems, but only 54% were actually doing it. Interestingly, fewer than half the respondents were happy with the performance and reliability of their IT infrastructure.

Putting these figures together reveals an interesting point: executives want a reliable IT infrastructure that pays dividends, they don't think they've got one now, but they're dying to get one.

Yet there are many ways to business improvement, and any organisation will face a variety of ideas as to how the IT infrastructure can be improved. Recognising the potential conflict over IT spending priorities, analyst firm META Group has offered some guidelines for prioritising IT projects:

- ① Weigh these IT projects' contribution to increasing the enterprise's presence and performance in the market. Rate the IT project's contribution to business performance on a scale of 0 to 100.
- ② Quantify the IT project's role in reducing business cost, again on a

scale of 0 to 100.

- ③ Assess the project's risk in terms of completion on time, completion on budget, and business benefits realisation. Use a scale of one to seven to assess each project's potential risk, then adjust project priority accordingly so that high-value projects with low risk factors are done first.
- ④ Derive project priority. Each project's final priority is determined by using the risk factor to offset performance improvement and business cost reduction. This will give you a final, prioritised list of projects that can be followed to minimise risk and maximise benefits.

Once the projects have been prioritised, META Group recommends a five-step process to ensure things go to plan:

- ① Work with business units to develop project governance guidelines.
- ② Link project development methodologies with project priority policies, so IT staff are aware of policies at the right time.
- ③ Adjust change management processes so that project release activities follow the prioritised project list you established above.
- ④ Establish a project priority review board to approve the recommended priorities according to the list.
- ⑤ Audit compliance with the project priority scheme every six months.

Source: META Group Inc.

operating system and the OpenOffice productivity suite has gone through the roof.

Budget-squeezed organisations such as education departments have been particularly keen to explore the combination, which costs virtually nothing to install and provides most of the features needed by most IT users.

Linux is also gaining strength on the server side, where support from heavy hitters like IBM and Hewlett-Packard has made the operating system a viable alternative to Microsoft Windows 2000.

By keeping your options open, it's possible to stretch your IT money much farther than you think. Using Linux and OpenOffice during a desktop refresh could significantly reduce costs compared with installing Windows and Office, saving money that can be spent elsewhere.

Without considering such options, licensing fees — which have risen across the board as vendors seek to counter the effect of the IT spending slowdown — will consume an inordinate portion of IT budgets.

"We've found the operational side of the budget, such as licenses and insurance, has been increasing," says Geoff Wilson, manager of information management with Main Roads Western Australia. "IT is still largely seen as an expense to the organisation, and the part of the budget we would call discretionary spending has dried up."

"New projects just aren't happening, and our equipment needs to last a bit longer. Our funding just covers the expenditure for running the business."

SCALING BACK

What new projects have been run are smaller than ever. Currently, for example, Wilson's department is building a contact management

solution for the company's Web site. Wilson would ideally like to focus on an infrastructure upgrade — including a networked storage solution that would save the organisation from having to manage ever-growing numbers of servers. But for now, such grandiose plans are on hold.

Main Roads WA was one of many government organisations to outsource its IT operations, a move that was originally sold as cutting costs substantially. But outsourcers are struggling with the same problems as their customers.

Cost pressure is also limiting the variety of services those outsourcers can offer — which, in turn, is limiting the choice of systems customers can install. For that reason, it's best to consider outsourcing only when you want to offload management of systems that are predictable and unlikely to change.

Wilson's IT budget slashing is a blessing in disguise for other reasons. Given his IT organisation has no money to pursue strategic initiatives of its own, he must liaise with individual business owners to have them fund new projects. And since those business owners have put their necks on the line, they naturally take a major interest in making sure their operations change to take advantage of the new IT system.

Increased scrutiny of the project means it can take longer to get sign-off, but once the project is going this scrutiny can work wonders for getting the job done. Support from the business owners relieves pressure from Wilson, whose unit can focus more on delivering the project and less on justifying its existence.

This has been a major recurring theme in advice for IT managers, but the fact that everybody's wrestling with such reductions may finally make this approach mandatory.

Projections for 2003 and beyond suggest a



► **Get serious:** despite 9/11, Gartner analyst Daniel McHugh says security budgets are often given lip-service.

gradual upturn in spending, but nobody is even pretending that IT investment will regain the momentum it once enjoyed.

If any good comes out of the current spending downturn, it is likely to be the common understanding that IT is not simply a black hole where money goes and is never seen again. Rather, cost pressures are fuelling collaboration between business and IT leaders on an unprecedented scale. This unity — in a time of common need — could well paint the way forward when IT budgets eventually pick up and businesses become more optimistic about IT in the future. [EITC](#)

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IT'S NOT FOR THE FAINT HEARTED



Sapphire Radeon 9700 Atlantis Pro graphic card



Powered by ATI Technologies, Sapphire has just added an exciting new addition to its powerful line of graphics accelerator products. The Sapphire Radeon 9700 ATLANTIS Pro incorporates the brand new RADEON 9700 PRO graphics chip. It delivers the highest levels of performance to the gaming and PC multimedia enthusiast available today! Just one look at the Sapphire Radeon 9700 Atlantis Pro and you will discover that its not for the faint hearted.



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WORKSHOP

Hands-on with hardware and software, plus bonus CD content

We've been receiving some fantastic feedback on recent Workshop articles, along with suggested topics that readers would like covered — some of which have made their way into this month's Workshop pages. For example, everyone who uses Windows has to work with files and folders, but Windows' Explorer file manager isn't always the best tool for the job. Serdar Yegulalp reveals a bunch of tricks to make Explorer a little easier to use, plus some third party add-ins and replacements for Explorer.

And many Linux users find themselves surrounded by a sea of Windows machines, hooked up to Windows networks and Windows-powered servers. Matt Overington, our resident Linux guru, finds himself in exactly that position, so he's penned this month's feature on successfully living with Linux in a Windows world.

There's also a quick guide to setting up a RAID hard drive array on your desktop PC; using Java to help visitors navigate your Web site, and creating customised bookmark icons (called "favicons") that'll make your site stand out from the rest on people's bookmarks or favourites list.

Workshop's site of the month



Here's one of the many sites which we visit on a regular basis, especially when new hardware hits the streets. Overclockers Online (www.overclockersonline.com) isn't always up-to-the-minute but the content is thoughtful and, thankfully, free of the overbearing, opinionated indulgence that typifies many similar sites.

Bonus CD software icon

Many Workshop articles are accompanied by bonus software loaded onto our cover CD set; just look for this icon. This is often software that's integral to the article, such as this month's feature on pumping up Windows' Explorer. The selection ranges from full-working versions and trial versions to shareware and freeware.

While APC can't provide tech support for these programs, if you've got a problem with the CD itself, by all means holler our way (see pages 8–9 for details of how to contact the CD team).



Workshop this month

102 Windows Explorer

Enhance or completely replace the Windows file manager. Serdar Yegulalp presents a range of add-ons and alternatives to Windows Explorer.



105 Hardware

Ashley McKinnon explains how using the RAID hard drive array can boost your PC's performance and reliability.



106 Linux

We show you how to connect your Linux PC to the rest of the office when everyone else is running Windows.



112 Web

David Williams demonstrates a useful Java applet that's fast, easy and free. It's a great way to enhance your Web site.



114 Networking

Want to go wireless with Windows XP? Serdar Yegulalp has all the information and tips that you need.



118 Photoshop

Trevor Morris has everything you need to know about designing customised bookmark icons for your Web site.



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Utilise Microsoft's free Remote Desktop Connection Client for Mac OS X and access Windows software from your Mac.



Explore your options



Serdar Yegulalp reveals ways to enhance, or completely replace, the Windows Explorer file manager.

Files and folders are a cornerstone of the graphical user interface: a simple and elegant way to represent data using real-world analogies that everyone understands. So why is it that working with files and folders can be such a cumbersome task?

Often it's the tools themselves. The File Manager of Windows 3.x is a case in point. Yes, it did the job, but it was almost universally hated. And for good reason: it was limited, clunky and ugly as sin. Power users didn't have long to wait before File Manager enhancements and wholesale replacements appeared.

Windows 95 took several steps forward with the slicker Explorer Manager, but at least one step backwards, because unlike the Windows 3.x File Manager, the new Explorer couldn't open two folder windows side by side.

Windows XP introduced several improvements — I don't think I could live without Thumbnail mode, for instance — but there are still many parts of the Windows Explorer that could be a lot better. Luckily, there are plenty of add-ons and even full-blown replacements for Explorer.

EXPLORER 101

The best place to start is by making the most of Explorer's out-of-the-box capabilities. First up, get used to the fast way to launch Explorer: hold down the Windows key and press E. This launches Explorer with the focus on My Computer in Windows 2000 and XP, or My Documents in Windows 9x.

You can also create a shortcut that will launch Explorer with the focus on a particular drive or directory. The command line string for Windows XP and 2000 is

```
%SystemRoot%\explorer.exe /e,c:\downloads
```

For Windows 9x, it's

```
C:\Windows\Explorer.exe /e,/e,/root,/select,C:\
```

In both these examples the focus is on the C drive. Add a specific folder after the drive letter (for example, c:\downloads) and Explorer will open on that folder. Pop these customised shortcuts on the desktop or the QuickLaunch toolbar and you'll never be more than a one click away from your most-used folders.

If the flock of root-level folders in Explorer is a bit confusing, you can make folders stand out by giving each one a custom icon. Right-click any folder (bar Program Files and



New look: changing the icon for root-level directories from their standard folder glyph to a more appropriate icon makes it a little easier to navigate with Explorer.

Windows, which are locked into their default system icon) and choose Properties, then click the Customise tab. Click the Change Icon button at the bottom of the Customise page and select a new icon.

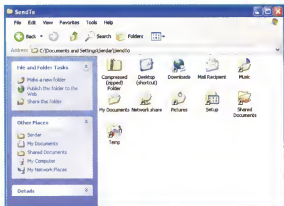
The default setting is to use an icon from the shell32.dll library, although you can easily assign icons from other programs or download new sets from the Web.

RIGHT-CLICK YOUR WAY TO FREEDOM

One of the smartest tricks introduced in Windows 95 was Explorer's Send To menu. Right-click any file or folder and the Send To option lets you fling it to one of several pre-set destinations, ranging from system folders to drives to other applications (by default, these include the resident email client and Windows' Compressed Folder archiver, as well as dynamically adding removable storage drives such as flash memory keys).

You can add to the list of destinations on the Send To menu by lodging appropriate shortcuts in the Send To folder. In Windows 9x this is located in the Windows folder; in Windows XP, there's a separate Send To folder for each user (inside their Documents and Settings directory).

Many third party programs take advantage of Explorer's right-click menus to add extra functionality — although if you have too many of these applications installed, the size of



the menu can become bewildering. As a result, canny users choose their right-click tools with care.

One utility that covers a great deal of right-click territory is SendTo Magic (<http://donovandunning.com/stm.html>). If you thought it was cool to be able to add your own items to the Send To folder, SendTo Magic goes a step further by intelligently augmenting the Send To section. It lets you copy or move a file or folder to another folder or drive, with the most recent target folders held in a favourites list; create a shortcut from the selected item and add it to the Quick Launch bar, the Send To menu, the StartUp folder or the Start menu; or even add the item to IE's Favorites list.

The program is designed to use the minimum number of clicks and mouse actions to do any given thing, so it's a lot more satisfying than hunting for and opening the target folder "by hand". If you're constantly shoving things into the same folders over and over, this is a terrific timesaver.

One thing SendTo Magic doesn't support is sending a file to an FTP site. For that, turn to SendTo FTP (www.pclighting.com/sndtoftp.html), which adds a Send to FTP extension to the Send To menu. Like SendTo Magic, it remembers your last connections and target folders — and it also makes the process a lot simpler than if you were to open an FTP client and drag-and-drop, which is the whole idea. One really nice feature is it lets you browse the remote site's directory listings rather than forcing you to type the path name.

REPLACEMENTS

A lot of people are happy to add just a little more smarts and user-friendliness to Explorer, but there are some who find it best to bring in a more powerful file manager. One of the best is PowerDesk 5: it's powerful, flexible and free!

PowerDesk began as a commercial product which passed through several companies before ending up with OnTrack software. OnTrack eventually released PowerDesk version 5.0 as a completely free program, with an even beefier PowerDesk Pro 5.0 offered for sale. That edition is now part of the V-Com stable (www.v-com.com), but it's hard to go past the freebie 5.0 standard release.

PowerDesk has the same basic two-pane design as Explorer but with many other functions shoehorned into it, some taken from other aspects of Windows. For instance, if Internet Explorer can have a Favorites section, why can't Explorer have its own — locations like the Control Panel

Explore
Open
Browse With Paint Shop Pro 7
Search...

Send To

Cut
Copy
Paste

Create Shortcut
Delete
Rename
Properties

Smart Send To: add your own set of destinations to Explorer's right-click Send To menu by placing shortcuts in Windows' Send To folder.

Compressed (zipped) Folder
Desktop (shortcut)
Downloads
Mail Recipient
Music
My Documents
Network share
Pictures
Setup
Shared Documents
Temp
3½ Floppy (A:)
CD-RW Drive (D:)

or programs such as Notepad? That's one of PowerDesk's clever features.

Another thing which PowerDesk brings in from other versions of Windows is the ability to explore archives (such as ZIP files) as though they were directories. They've also added something seen in the Microsoft PowerToys collection: the ability to open a command line in a given folder with a mouse click. I also like the File Info view while in Details mode: the data in this column varies with the type of file, but it's the most important metadata about the file that's not present in any of the other columns (time/date, size, etc.). For text files, you get the first few words in the file; for MP3s, you get the ID3 tag.

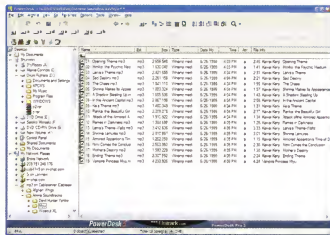
Other features include UUencode and decode; file encryption and decryption using the DES algorithm; secure (destructive) delete; and the ability to copy the name or path of a file as text to the clipboard. There are even shades of the old Windows 3.x File Manager in the iconic drive bar and a highly customisable toolbar.

Power users will appreciate extra features packed into the Pro version, such as native FTP support. This is something Windows 2000 and XP tried to integrate into their shell without a great deal of success, as it's far too cumbersome to use well, but PowerDesk's FTP support is very no-nonsense and solid.

Integrated FTP seems to be all the rage among programs like these, as Directory Opus, another beefed-up Explorer replacement, has that as well as many other interesting additions. It's got a three-pane view as opposed to the usual two-pane: tree view, folder view and persistent file preview, plus extra navigational buttons for the folder pane for quick up-one-folder/back-to-last-folder movement.

The most commonly browsed folders are held in a list called the "SmartFavorites", which can be quickly brought up in a variety of contexts. One pet peeve with the program: by default it has a set of annoying action sound effects turned on, but I was able to shut that off in short order. The only other drawback: the preview pane doesn't do video, only text, hex/binary and image files.

In fact, Directory Opus has so many cool features I could exhaust the rest of the magazine listing them all. A quick



Power to the people: PowerDesk is a superb and highly customisable file manager, with features such as the File Info metadata column in Details view.

example. By default, whenever you perform operations that require a progress bar (such as copying a bunch of files), you can turn off the progress bar if the action takes less than x milliseconds; this keeps the bar from being popped up on you if you things take a long time on your machine. Another function I found myself in love with was being able to cycle quickly through the various directory listing styles — icon, thumbnail, quick info, detailed info.

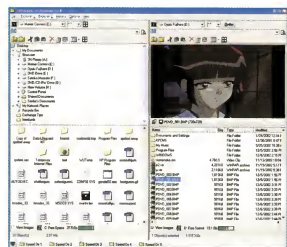
Another Explorer variant with some features that range from quirky to downright odd is FileStream's Turbo Browser (www.filestream.com). Rather than just stick with two panes, Turbo Browser lets you open as many extra panes as you need, and adds another feature that will either endear you or annoy you: one-click previews.

By simply selecting the name of a file, a window pops up with a preview version of the file. For audio files, the appropriate ActiveX or ActiveMovie container in Windows is used. However, when you click on multiple files in succession, they're all previewed separately — if you do this with several MP3 files, for instance, they'll all be playing one on top of the other! You can turn this feature off, but it's frustrating not to be able to simply have one preview end when another starts.

That said, there are some features in Turbo Browser which are valuable and rare. My favourite is the Open As function, which lets you take any file and quickly open it as text, HTML, hex, or as any registered document type (provided it can be opened in that format).

Also included is a very full-featured and heavily integrated FTP client — when you connect to an FTP site, the full site tree is shown as an extension of the system's own file-and-folder tree, allowing for easy drag-and-drop copying. Right-clicking on a file in the FTP tree lets you point to a local folder to download it into. Even if you don't use many of the other features of Turbo Browser, the FTP client alone makes it worth looking into.

A further twist on Explorer is TWinExplorer Plus!made 2.8 (www.pepsoft.com/twinx/index.php). If you've ever used the Norton Commander or other programs of its ilk back in the DOS days, you may remember NC's two-pane display. Since most file operations involve copying or moving things from one place to another, TWinExplorer keeps a double-pane view



Double vision: like to browse in two windows at once, like Norton Commander? TWinExplorer was built with you in mind.

open at all times. The panes can explore any area Explorer would normally go to, including FTP sites or remote-machine shares (if your version of Windows supports those).

Also nice is a quick image-preview function, which also includes a slide-show, and running free-space meters for the drive you're currently exploring. One feature I really liked: programmable "Speed Directory" (think speed dialling) buttons, which quickly takes you to commonly-used directories.

A major omission, though, is support for a thumbnail view, which would be great when combined with the quick preview mode. This program's not as all-encompassing a replacement or augmentation for Explorer as some of the other programs here, but if you cut your teeth on using two windows at once, this lets you keep a good habit.

Another unique directory browsing tool is Bojanov Tbrowse 1.1 (<http://home.blic.net/dbojan/bin2/tbrowse.cab>). Tbrowse sits in the system tray and pops up a list of all root drives and folders when clicked on. With successive clicks, you can drill down or back through the directory structure to a particular file. <http://www.blic.net/dbojan/bin2/tbrowse.cab>

Gimme a command line!

Despite all the cute visual cues and drag-and-drop simplicity of a Windows file manager, there are times when the good old command line remains the best quick'n'dirty way to get things done. All power users respect its presence.

But one of the most annoying things about the command line is how hard it is to drill down through 10 folders with it — especially if you've got folders with names like "February-April Reports, 2002".

Rather than pound your fingers flat typing pathnames, XP users can download a handy Open Command Window Here utility that's one of Microsoft's famous PowerToys suite (www.microsoft.com/windowsxp/pro/downloads/powertoy.asp). Use Explorer to navigate your way into the relevant folder, then right-click and a DOS box appears.

If you don't have XP, CFI Software's ShellToys XP utility provides this same feature (and plenty more) for Windows 98, Windows Me and Windows 2000 (www.cfssoft.com).

DIY RAID technology

Ashley McKinnon shows how using RAID can boost your PC's performance and reliability.

RAID stands for Redundant Array of Inexpensive Disks, and the technology was originally developed for the network server world, where access to critical information meant data have to be available 24/7.

To achieve this, vendors developed ways to allow several hard drives to be linked together and share the same data. If one drive failed, the others stepped in and the system kept humming along. Now that large hard drives have become almost a commodity in pricing, home users can also enjoy the benefits of RAID.

RAID can be implemented in two ways. Hardware RAID requires special components, such as a motherboard that supports RAID or a dedicated RAID controller card. Software RAID is handled by the operating system, and is built into Windows 2000 and Windows XP. This makes it the easiest and least expensive of the two to implement, and here's what you need to know.

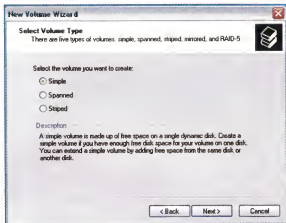
RAID IN WINDOWS XP

This Workshop uses Windows XP Professional, although the same theory and execution applies for Windows 2000. Software RAID isn't supported natively by Windows 9x or Me.

The major hurdle with software RAID is that the OS can't reside on a drive that is part of the RAID array. This is because the software drivers that control RAID need to be loaded by the operating system before a RAID array can be seen, and they can't be seen if the operating system itself lies within the RAID array. As a result, you need a minimum of three hard drives to get software RAID working natively under Windows XP or 2000. But don't be discouraged — you can pick up drives at amazingly low prices these days. For example, Maxtor offers a 40GB ATA133 drive which spins at 7,200rpm for around \$159. That means you can get 80GB of RAID-ready storage for a little over \$300.

Software RAID supports two modes of RAID: RAID 0 (also known as striping) and RAID 1 (or mirroring). RAID 0 allows you to merge areas from two hard drives into one logical drive. There's no redundancy with RAID 0 but there is a considerable performance boost. RAID 1 simply replicates data from one drive to another, so it offers true redundancy.

Once you've installed the additional hard drives, open Windows XP's Control Panel, select Administrative Tools, Computer Management, and then click on Disk Management to bring up a visual representation of your current disk drives. Any drives that are to become part of a RAID array must be converted from Basic Disks Into Dynamic Disks. This is done by right-clicking the drive and selecting Convert to Dynamic.



Easy does it: Windows XP's New Volume Wizard helps set up your hard drives as a RAID array using a variety of RAID modes.

SETTING UP RAID 0

Striping (RAID 0) logically involves joining two drives together. Right-click on the unallocated section of the target dynamic hard drive, and then from the pop-up windows select Create Volume. If your hard drives are different in size, select the smaller of the two as the first drive to Stripe, as the volumes will need to be the same size on each drive. Then, select Striped Volume under the Volume Type selector.

You'll be presented with a list of available drives with enough space to service the volume you just selected. Select the drive you want to use and click Add. Note that no matter what the size of the second drive, it will be limited to the size of the first drive selected.

Once this has been done, assign a drive letter and format the Striped Volume as you would any other hard drive. You can use either the FAT32 or NTFS file systems. When completed, the Striped volume will show up under Disk Management as two joined hard drives, both sharing the same drive letter. The Striped volume can now be used just as if it was a normal hard drive.

SETTING UP RAID 1

Creating a Mirror (RAID 1) is even simpler. After converting the drives to a Dynamic as described above, right-click on the dynamic drive that will be the main drive and then select Add Mirror. You'll be asked which drive to add as the Mirror. Select the target drive from the available list and the mirror will be created. Note that you'll need to have a second available dynamic disk in order for RAID 1 to be available.

The drives will now show up sharing the same drive letter. Just like with Striping, it's necessary to select the smaller drive as the first drive. The second or "mirror" drive will be limited to the size of the first drive, to assure compatibility.

Linux in a Windows world



Matt Overington shows you how to connect your Linux PC to the rest of the office when everyone else is running Windows.

More and more people are getting comfortable with Linux and learning that you don't need to run a bloated bells-and-whistles OS for basic work tasks such as running office productivity software, attending to email and browsing the Web.

In a small business environment, much of the initial start-up costs end up being sunk into an IT infrastructure—not the least of which includes software. If you can avoid licensing costs and proprietary systems for productivity software, you can save hundreds or even thousands of dollars from the IT spend.

In fact, slipping just a few Linux boxes onto your office network can make a difference to the bottom line. The big question is whether or not you can do everything under Linux that your colleagues can under Windows. After all, what good is your Linux box if it's just a data island in a sea of Windows machines?

MAKING A LIST, CHECKING IT TWICE

The first thing that you should do before considering the move over to Linux is ensure that you can work successfully in a Linux world. After all, what use is making the move to Linux if you have to boot to Windows regularly to use a piece of software like Adobe Premiere?

Start out by drawing up a list of the programs that you use on a daily basis. Include everything, right down to instant messaging programs. Keep working on this list for at least a

week and you'll end up with a record of all the applications that you require to get your job done. Then determine which applications can be replaced by Linux versions. Chances are there are already Linux versions of most of your software, and if not, there is something compatible.

A good source of information regarding this software is www.sourceforge.com. If there's no direct equivalent between platforms (such as Adobe Premiere), look into running your Windows version under Linux by using an emulator like Win4Lin, or a program that enables access to the Windows API set, like Wine.

The first and most obvious place to start is with the most commonly used of all productivity apps: Word and Excel. There are now a great number of Microsoft-compatible productivity suites available for Linux, the foremost being OpenOffice and Sun's StarOffice. But because Microsoft's file formats are as closely-guarded as KFC's 11 secret herbs and spices, neither StarOffice's nor OpenOffice's implementations of Word DOC and Excel XLS formats are 100% Microsoft-compatible. So give each program a solid trial period before you commit to using either of them.

Downloading the Windows version of OpenOffice (from www.openoffice.org), run it for a few weeks and try to read and write to every Word and Excel file you come across. If this works well, you're probably safe to move over to using the Linux version of OpenOffice full-time. You'll find the Linux version of OpenOffice 1.0.1 on this month's cover CD set.

If you've already made a significant investment in Microsoft Office, you might want to consider using Wine or CrossOver Office instead of OpenOffice to run your original applications natively. Wine can be used to run many Windows applications under Linux, whereas CrossOver Office is limited to running Office itself.

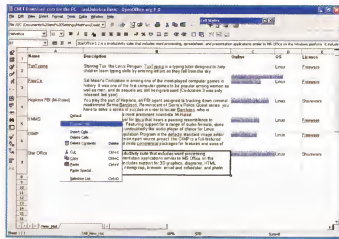
WORKING WITH EXCHANGE

Many offices rely on the Microsoft Exchange server to deliver email and contact details to network users. Once upon a time, connecting a Linux machine to Exchange for email, as well as scheduling meetings, was tricky to say the least. That's all changed now, and the best proof of this is Ximian's Evolution, a program which shares the look and feel of Outlook (reviewed on page 39 of this issue).

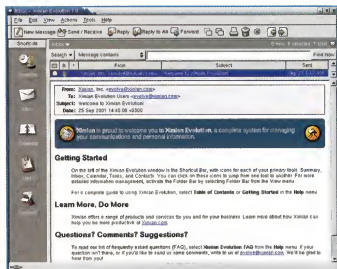
With the aid of Ximian's commercial Connector plug-in, Evolution can be used as a client for Exchange 2000 server. This month's cover CD set includes Ximian Red Carpet, which loads the latest 1.2 version of Evolution onto your PC.

CONFIGURING SAMBA

After you've taken care of Internet connections and email connectivity, you'll want to make sure that you can share



Efficient: OpenOffice.org gives you most of the functionality of Microsoft Office without the associated price tag.



Well-connected: you can use Ximian's Evolution to connect to an Exchange Server.

Application replacements

Before you abandon Windows entirely, make sure you can work under Linux. Here's a list of common Windows applications and what you can replace them with.

Adobe Photoshop The GNU Image Manipulation system, or GIMP, needs little introduction to Linux users. Professional graphic designers are increasingly using this image editor as its speed and simplicity provides a relief from commercial packages (www.gimp.org).

Internet Explorer Netscape Navigator remains the most feature-rich browser for the Linux platform (www.netscape.com).

Microsoft Office OpenOffice.org is easily the most fully-featured Linux productivity application available and gives many commercial packages a run for their money (www.openoffice.org).

Microsoft Messenger Alvaro's Messenger is a handy tool around the office and home (<http://amsn.sourceforge.net>).

Microsoft Outlook/Qualcomm Eudora Ximian Evolution is an email, contact, calendar and task list manager for Linux that looks and feels like Outlook. It can even talk to an Exchange 2000 server via a commercial plug-in called Ximian Connector (www.ximian.com).

Winamp The X MultiMedia System, or XMMS, is the most popular audio player for Linux (www.xmms.org).

files with other members of your office LAN. Virtually every business works with files that are too large to email conveniently, so the ability to access a Windows shared drive is vital if you're to get by with Linux in the workplace.

The package to add to enable your Linux box to communicate with Server Message Block (SMB) clients is called Samba, and is provided with most Linux distributions (full installations of Red Hat, Mandrake and Debian all include Samba). The SMB protocol is used by all increments of Windows from Windows for Workgroups (version 3.11) onwards to provide file and print sharing services.

Samba is a flexible tool that can also be used as a Windows Internet Naming Service (WINS) server or Domain Controller, although this guide assumes that you're not using your Linux box as the server on your office LAN. If you're after more information on the range of tasks Samba can fulfil, have a look at www.samba.org.

We've included the latest version of Samba on this month's cover CD, but before you get it, make sure you need it. Open a terminal window, and enter the following command at the console:

```
rpm -qa |grep samba
```

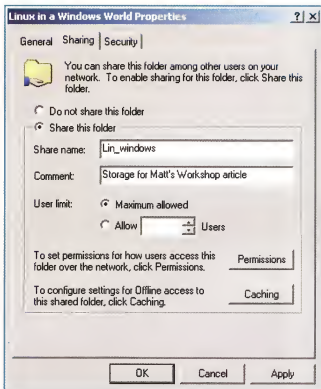
If you get three package listings, namely "samba", "samba-common", and "samba-client", then you've already got Samba loaded on your system and can skip over the installation. Note that you only need the "samba" package if you are going to be sharing your files to Windows machines.

If you need information on how to configure Samba to share files from your Linux box, either visit www.samba.org or pick up a copy of *The Linux Pocketbook*, which we provided as a PDF on the APC November, 2002 cover CD. If you don't already have Samba installed, mount the cover CD and open the Workshop section of the disc. Copy the Samba installation packages to your home directory and open a terminal window. Enter the following command at the console to copy the packages to your system:

```
rpm -Fvh *.rpm
```



► **Linux grooves:** although it's not a productivity application, most Linux users would be lost without XMMS.



Follow the remaining installation guides under the Workshop section of the CD.

SHARING FILES

After you've got Samba installed, accessing Windows partitions is extremely straightforward; mount the shared network drive just as you would a normal drive, except using the `smbmount` command. For example, if you wanted to mount a folder called `work_share` on a Windows machine with the IP of 203.12.5.55, you'd stick to the following procedure. First, you make a directory to use as a mount point by typing:

```
mkdir /mnt/winshare
```

from the console. After you've got a place to mount the network resource, you can enable access to it by typing:

```
smbmount //203.12.5.55/work_share /mnt/winshare
```

You will be prompted for a password as Linux attempts to establish a connection. If you don't have a password specified on the Windows machine (that is, you're using an open share), occasionally you'll have a problem with being asked for a password that you know you haven't set up. If this occurs, try adding `-o guest` to the `smbmount` command — this passes the username "guest" to the remote Windows machine.

After you've finished using the shared folder, you can unmount the drive from your Linux box by using the `smbumount` command. When you've installed Samba on

Samba: you can share files under Windows and access them under Linux using Samba.

your machine, you can also add network folders to your filesystem table (stored in `/etc/fstab`) to automatically mount the shared drive at each boot. Add the following line to your `/etc/fstab` file:

```
//[host IP]/[share name] /mnt/[mount point] smbfs guest 0 0
```

SHARING A PRINTER

What good is having a Linux PC that you can work on if you can't get that information to the office printer? Samba can dance to many tunes, and one of its more practical functions is to enable Linux machines to print to Windows printers.

You can add a Windows printer to your Linux machine by opening `printconf` from the console to spawn the printer configuration wizard. Click on `New` to begin setting up your Windows printer connection. Type in a name for the printer in the Queue name box and select Windows from the queue type (some distros will list this option as SMB). Click `Next` to continue, and

you'll be presented with a screen to let you configure your print queue. Type in the Windows share path into the first box (for example, to share a printer called `inkjet` on a Windows machine called `fred`, the path would be `//fred/inkjet`). Enter any username and password information that might pertain to the shared printer — if there is no password configured, the default is "guest".

You'll need to enter the host IP and workgroup information, but that can be grabbed from the remote Windows machine without too much difficulty. There's also a box that can be checked if you want to convert Unix line endings to Microsoft-compatible line endings. This ensures that carriage returns and line feeds are printed correctly between systems.

Note that your username and password are both stored locally unencrypted, so if you're connecting to a Windows printer regularly, you'd ideally want to set the printer up with a different username and password to that of the entire system.

Which distro?

Of the many flavours of Linux that are available, we recommend that you opt for Mandrake Linux 9.0, SuSE 8.1 or even Red Hat 8.0. Both have straightforward and user-friendly installers, along with configuration wizards that simplify the process of setting up an Internet connection (just make sure that you have your LAN settings recorded somewhere before you start the installation). When you've got your distro up and running, you can move on to actually installing the applications you'll use in your day-to-day business.

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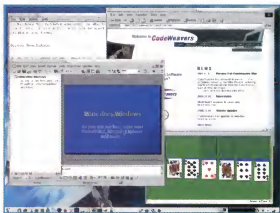
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► **Not an emulator:** Wine lets you run Windows applications natively under Linux.

After you've finished, you're free to send your jobs to any printer connected to a Windows print server. Another trick that Samba has up its sleeve that's invaluable in a Microsoft-dominated workplace is the ability to let your Linux box act as a print server on the network. Countless tutorials can be found online to help you achieve it, but we suggest that you look at *The Linux Pocketbook*. In case that's not enough, when you first set Samba up to share a directory on your Linux machine, it will automatically look in your `/etc/printcap` file and make any printers it finds available over the network.

FUN AND GAMES

With the computer being a communications hub for many people, there's a common concern that you'll lose the ability to have fun or communicate with people by moving over to Linux (unless all your friends are Linux-using geeks anyway). This isn't the case. Linux versions of common instant messaging clients like AIM, Instant Messenger and ICQ are stable and work just as well as their Win32 brethren. And even network games like Quake show no platform bias.

There are plenty of good reasons to add a Linux box to a Microsoft-dominated office LAN, and untold numbers of Linux geeks have toiled long hours over code to help you achieve it. We've aimed to provide a basic guide to performing the ultimate Windows upgrade here, but the applications you use may be a little different. There are probably a few applications that you'll want to track down, and a couple of tweaks you'll want to perform to customise your work environment.

Wander over to sites like <http://sourceforge.org> or <http://linuxcentral.org> and run a search to find any extra viewers or converters you might need to read a specific file format. Of course, if all else fails, you can still run Win32 applications like Quicken Cashbooks and Adobe Photoshop through Wine, so you don't need to abandon Windows programs (and file formats) entirely.

Basically anything your Windows-based machine can do around the office, a Linux machine can manage effortlessly. Powerful Linux tools exist for Web browsing, email, instant messaging, graphics manipulation, Web development, database manipulation, spreadsheet processing, word processing, the list goes on. You can even

get implementations of Microsoft's .NET platform for Linux and connect to an Exchange server natively.

With all this Windows compatibility constantly being rolled into Linux, the choice of operating system is increasingly coming down to personal preference, and fewer people have their application suite dictating their OS. **ETC**

Ten useful Web sites

www.sourceforge.org An online resource for open source projects where you'll find heaps of applications for Linux. It's the first place you should check for software.

www.winehq.com Wine (it stands for Wine Is Not an Emulator) is a program that enables access to Windows APIs under Linux. This means you can run Windows applications natively under Linux without the need for emulation.

<http://bochs.sourceforge.net> Bochs enables Windows programs to run under Linux. It works using emulation, so you don't need to purchase Windows.

www.codeweavers.com/products/office CrossOver Office can be used to enable Linux systems to work with Microsoft file formats. It retails for US\$54.95, but is invaluable in a mixed-OS office environment.

www.experts-exchange.com/Operating_Systems/Linux/ Experts exchange is an online forum for people to post questions regarding Linux software to a panel of geeks. Most questions are answered within a few hours.

www.freshmeat.org Another online resource that is packed to overflowing with software projects.

www.openoffice.org Sun's StarOffice was split into commercial and free versions, and the powerful OpenOffice.org remains royalty-free.

www.metroverse.com Win4Lin is a program that enables you to run Windows under Linux. The cover CDs on the January issue of APC contained a trial version.

www.sombo.org Samba, an Australian creation, is the premier file-sharing program for Linux. It offers full compatibility with Windows SMB shares, and you can even print to a Windows printer over a network.

www.ximian.org The home of Gnome, Red Carpet and the outstanding email application, Evolution.

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Give your Web site a Java makeover



Want to spice up your Web site in practical ways? David Williams demonstrates a useful Java applet that's fast, easy and free.

You don't have to be a programmer to enjoy the benefits of Java — it's for everyone. There are many Java applets, or small Java programs, available on the Internet and many of these are available for free.

These Java applets can be easily used on a personal Web site and have the potential to enhance it immensely. Many applets available are just gimmicky and can annoy visitors to a Web page while they wait for a large applet to download, just to find it provides yet another rippling text effect. But this column looks at an applet that can be really useful, and is easily customised to suit your needs without any programming skill required at all.

One of the oldest and most popular repositories for online Java applets is www.gamelan.com. Additionally, many programmers make Java applets available on their personal Web sites, however the "outline" applet covered here (and its accompanying "readme.htm" file) can be found on this month's cover CD.

The essence of the outline applet is to provide a user-collapsible and expandable hierarchy tree — much like Windows Explorer, for example. Any of the "leaves" on the tree can be turned into a hyperlink, so that clicking the leaf takes the viewer to a specific URL.

WHY IS THIS USEFUL?

This applet can be applied to a range of purposes. The most obvious is to provide a Windows Explorer-like navigator through the pages of a Web site. It is easy to imagine the outline fitting nicely in a frameset along one of the borders of the page so that it remains permanently displayed —

providing a consistent user interface.

Alternatively, an applet may be used in just one page on the site, providing a quickly accessed "site map" function. Indeed, the

leaves of the outline need not be full HTML pages as such, but just images. This allows easy construction of a personalised picture gallery, presented in an entertaining way that doesn't require visitors to scroll through page after page, repeatedly clicking on miniscule thumbnails. The pictures can be categorised, allowing quick access to those of interest to the viewer.

Another use might be to add a dynamic touch to a professional's online resume, with the hierarchical tree breaking down into sections and subsections, allowing the reader to zoom in on topics of interest.

In a similar vein, an applet can be used to represent any hierarchical information you might want to display, whether or not the items link to anything further. This can be useful for educational and informative sites. Obviously, a static hierarchy can be displayed on a Web site using conventional HTML editing tools, but the advantage of this applet is in the way it opens and closes, under user control. This not only saves screen space, but also can add interactivity to a site in a fun way!

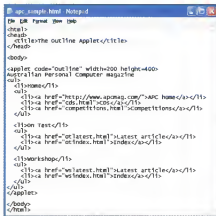
HOW TO DO IT

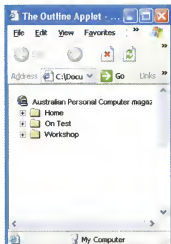
To use this applet, make sure the single file, Outline.class, has been published into the Web site's directory, on the Web server computer. This file contains the compiled Java applet code. Then, in the HTML pages for the site, insert an `<APPLET>` `</APPLET>` tag pair where the applet is to be used.

Between the tags, define the structure of the collapsible outline using just two other pairs of tags, `` `` and `` ``. Readers who already know some HTML will find these familiar, because they are precisely the same HTML tags used to structure lists of information in a Web page. The `` tag begins what is known as an unordered list, and the `` tag begins a new list item. This is the only "programming" knowledge required in order to use the applet. Here's an example. The code used to make the page which is displayed

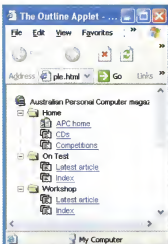


Room to explore: a real-life sample, presenting business training modules.

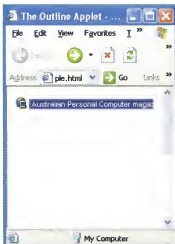




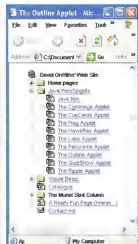
Branching out: the outline applet showing the three main options available.



Revealing: expanding the outline reveals all the sub-items available.



Within the fold: collapsing the outline completely hides all of the options.



The applet author's former Web site: Links allowed one to quickly navigate to any Java applet.

on the screen shots shown (and also available on the cover CD) is like so:

```
<applet code="Outline" width=200 height=400>
Australian Personal Computer magazine
<ul>
<li>Home</li>
<li>On Test</li>
<li>Workshop</li>
</ul>
<ul>
<li><a href="http://www.apcmag.com/">APC home</a></li>
<li><a href="cds.html">CDs</a></li>
<li><a href="competitions.html">Competitions</a></li>
</ul>
<ul>
<li>On Test</li>
<li><a href="otlatest.html">Latest article</a></li>
<li><a href="otindex.html">Index</a></li>
</ul>
<ul>
<li>Workshop</li>
<li><a href="wslatest.html">Latest article</a></li>
<li><a href="wsindex.html">Index</a></li>
</ul>
</applet>
```

Start with an `<APPLET>` tag, which instructs the Web browser that it needs to load a Java applet. In this case, the applet comes from a file called "Outline" as specified in the code modifier. The Web browser knows this means it has to request a file called "Outline.class" from the Web server. The width and height modifiers specify how much space the applet will take up in the Web page, and are measured in pixels. Be sure to give your applet enough room to display itself when fully expanded!

The following line is optional, and provides some text for the very top of the outline, if desired. The example uses Australian Personal Computer magazine, and this is precisely what can be seen in the screen shots.

Next, is a `` tag to begin a list — that is, a hierarchy of items. Each of the items in the list are shown when Australian Personal Computer magazine is first clicked on — and expanded. Look at the code. There are three items that belong to this list, namely Home, On Test and Workshop. Each of these is specified by a pair of `` `` tags. Each of the items has sub-items of their own. For instance, immediately following the Home item, another list starts. This list contains a further three items, APC Home, CDs and Competitions. Again, each of these list items is specified by a pair of `` `` tags. Finally, this new list ends, as indicated by the closing `` tag. Notice that for each `` there is a matching `` and for each `` there is a matching ``.

One final thing to note is the use of the HTML anchor tag (that is, `<A>` ``) to indicate a hyperlink. The APC Home entry, for example, has been turned into a hyperlink such that clicking on it makes the Web browser open the page www.apcmag.com. Conversely, the On Test entry is not a hyperlink. It is not possible to click on it. As a nice feature, the outline applet will use a different icon to indicate if the hyperlink refers to an external or a local Web page.

And that's all there is to it. If you can make a list using HTML tags, then you can use the outline applet. You don't need to understand the Java language in any way, nor do you need to know how the applet works.

It may be sensible to put the Outline.class file in the same directory as the page on which it will appear. To move it elsewhere, the code modifier in the `<APPLET>` tag must be edited to include the path to this file. If using FTP to upload files to the Web server, be careful to use binary mode for the Outline.class file, or else it will be corrupted and a "Class Format Error" message will be displayed in your Web browser.

THE AUTHOR

What does the author of this applet, David Griffiths, get out of it? Well, perhaps fame and a good feeling inside. Although he's closed his Web site, information about David can be found at http://antimoney69.tripod.com/dg_info.html.

Windows XP unplugged

Serdar Yegulalp explains how to go wireless with Windows XP. Is it true you've got nothing to lose but your cables?

When Windows XP was first rolled out onto the market one of the big selling points was out-of-the-box compatibility with the then-newly introduced Wi-Fi wireless networking standard. Wireless networking in the home and workplace has taken off since then, and while they haven't displaced conventional wired networks (what could?) they're no longer a curiosity. Prices are also much more affordable — to the order of \$200-230 or so for a good transceiver. A lot of it is not just due to the drop in cost, though, but XP's native support for this new technology with some wonderful possibilities.

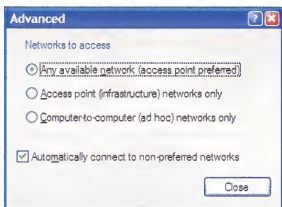
The single biggest place where wireless networking on XP becomes useful is with notebooks and other portable computers. But wireless networks are also useful on desktops in situations where running cables is impractical. The construction of my own house, for instance, makes it difficult to run wires inside walls. Rather than tear things apart and put them back together, I installed a wireless receiver on the house server, and another on the computer upstairs. No more cables cluttering the banisters, and when computers get relocated, there's no need to re-route wires or plug anything back in.

People who are familiar with conventional Ethernet may find wireless a bit daunting, since wireless networks are functionally different from a conventional wired network. XP makes some of that a little easier, although there are still some hurdles that many users may not clear without some help. In this article we're going to walk through the basics of wireless networks, look at how XP implements them, and examine some ways to set up common scenarios.

ON THE AIR

Wireless networking devices are basically radio transmitters that work at very high frequencies but only over short distances (just over 300 metres). The range of a wireless device varies heavily depending on the strength and quality of the transmitter, and on the condition of the airwaves. For instance, running a microwave oven will generally create enough interference to throw a Wi-Fi network off the air. Thankfully the system is designed to be robust enough to deal with such interruptions gracefully.

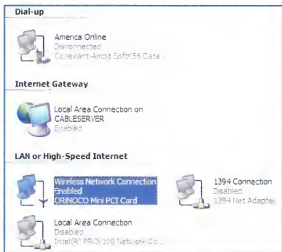
Wireless networks can work in one of two fashions: peer-to-peer or ad hoc networks, or infrastructure networks. Ad hoc networks involve each wireless transceiver talking to every other transceiver as a peer, rather than one serving exclusively as the "hub" for all the rest. Most setups that only



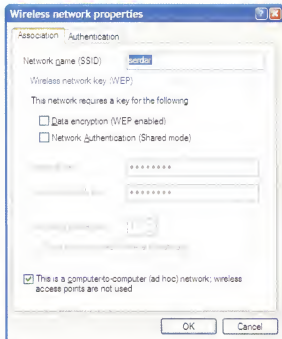
Be specific: click Advanced in the Connection Properties for a wireless connection and you can specify what type of wireless network is in use.

involve a few computers will be an ad hoc network: wireless hubs are not cheap, and it's often easier to outfit everyone with wireless transceivers and run in a peer-to-peer fashion. When you set up your wireless network in XP, you can specify whether to use ad hoc or infrastructure networks, prefer one over the other, or have XP default to whatever's available.

Infrastructure networks involve at least one wireless hub, also known as an access point. A transceiver will try to talk to whatever access point is closest, and access points can also be set to relay signals to each other or function as a repeater if need be. Many access points also serve dual duty as firewalls and cable/DSL routers, obviating the need for a server.



Visual basics: a wireless connection appears in the Network Connections folder as a LAN or High-Speed Internet Connection. The Internet Gateway shown here is from another machine with Internet Connection Sharing and a wireless adaptor.

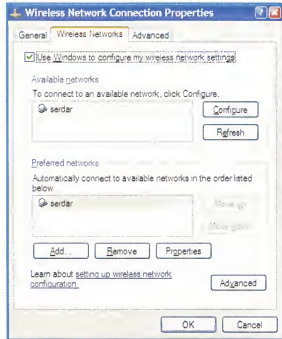


Unlocking the network: to identify a network over the airwaves, you need to use a unique SSID and an optional security key. The key encrypts the data being sent over the airwaves.

When you install a wireless device in XP, it shows up in the Network Connections folder as a LAN or High-Speed Internet connection. If there are other connections on the same machine, they'll show up with it, although in the example shown on the previous page, all the other network connections for that machine have been disabled and are greyed out. If a card doesn't have native driver support in Windows XP, you'll need to supply the drivers from the manufacturer. Many of the most common brands of adaptor, such as Orinoco, have drivers loaded with XP and can just be popped in and run.

Each wireless network in a given environment has a name or an SSID. This is a simple alphanumeric string of 40 characters. It is not a security key (see below for that) but a simple way of identifying what network the adaptor belongs to. A loose analogy would be the workgroup name used by Windows networks; any machines that use the workgroup name can see each other, but only each other.

Networks can also have a wireless network key. The key encrypts the data being sent over the airwaves, since it is entirely possible for someone to intercept the transmissions and decode them with little effort. If you're using encryption



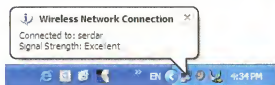
Preferences: the Wireless Networks tab lists which networks are available, which you prefer to connect to, and in what order. Hit Refresh to see if there are any new networks on the air.

native to XP, the key can either be five or 13 characters (for a 40- or 104-bit key). However, drivers not provided by Microsoft may have varying keylengths — and those keylengths or encryption standards may not be compatible between manufacturers.

For this reason alone, settle on one manufacturer of wireless hardware when you set up your network. If you need to install Wi-Fi on more than one platform you will get a more consistent feature set this way, and you won't have to forego encryption on the whole network because one machine doesn't support it.

Once a network is detected, a balloon dialog will pop up announcing the connection. If there is more than one network in the area and you want to select between them, right-click on the network icon in the System Tray and select View available wireless networks. This produces a list of all available wireless networks, organised by SSID. Note that if you need to provide a security key for that network, you will need to type it in here.

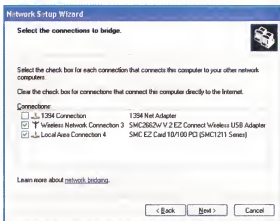
If you want to pre-identify which network to connect to, select Advanced from that dialog. This brings you to



Getting connected: XP pops up a balloon dialog to let you know that a wireless network has been detected.

Attention to antennae

A quick rule of thumb about the quality of a given device: check the antenna. A device with two antennae can generally outperform a device with only one. In my household, I have four devices: two PC Card-style adaptors; one adaptor with two antennae; and one with only one. The two-antenna adaptor is used as the transceiver for the house server, since it broadcasts and receives better than the others.



the Wireless Networks tab for that connection icon. Under Preferred networks, click Add and supply the SSID (and the key, if needed) for a network you want to attempt a connection with first. Note that the "Key is provided for me automatically" box should be unchecked; if you're in an ad hoc network check the box at the bottom that says "This is a computer-to-computer network." The order in which the network SSIDs are listed in Preferred networks is the order in which the system will search; you can click the Up or Down buttons to change their priorities.

SHARE AND SHARE ALIKE

One of the main reasons to setup a wireless network between two or more machines in a household is Internet Connection Sharing. Wireless connections in Windows XP are treated like any other network connection when it comes to ICS; you can either use them to receive a connection from an ICS server, or send signals to ICS clients.

If you have an ICS server set up with a wireless adaptor as its local interface (i.e., the adaptor that your in-house computers connect to) you will still need to specify a SSID for the wireless network. ICS doesn't generate these automatically. The best way to do this is to install the adaptor on the server, pick an SSID for it (remember, it needs to be the same SSID as all the other wireless adaptors you want to be able to talk to it), and then run the Home Networking Setup Wizard. The client machines should have their wireless adaptor's TCP/IP settings set to obtain an IP address and DNS server automatically.

Note that a network adaptor that's set to obtain IP addresses automatically will self-assign a randomly generated address if it can't find an ICS server. This address won't allow you to communicate with any other machines, though. To force the machine to redetect ICS, disable and enable the network adaptor, or go to the command line and type **IPCONFIG /RENEW**. Either action will discard the randomly-generated address and fetch a fresh one.

If your machine is still not recognising the ICS server, make sure the other wireless network properties are still valid. One way to troubleshoot this is to manually set IP addresses in the 192.168.0.x address range for both machine's adaptors (with the gateway set to 255.255.255.0) and see if you can get one to PING the other. If you can't even get a PING between

Bridging the gap: use the Network Setup Wizard to configure a connection as an interface for an ICS server, alongside other adaptors.

the two machines, something's wrong with the SSID or encryption setup; make sure both machines are the same in that regard.

MIX AND MATCH

What about mixed-media networks — a network that contains both wired and wireless segments? This is where Windows XP's network bridging feature comes in handy. The network bridge allows you to route data between two physically different networks, regardless of what type of media they use. Originally it was used for bridging connectivity between token-ring and Ethernet networks, but it can be used to interlink any two types of networks with incompatible media. Wired and wireless are of course the example we're dealing with here.

When you set up a network bridge, the adaptors listed in the bridge can all speak transparently to each other. Nodes on both networks can see each other without the need for packet forwarding, and all the networks use the same protocols. You can only create one network bridge per computer, but that bridge can have as many adaptors as you want on it. In the screenshot above, a local and a wireless network are bridged together — although the FireWire link is not, since there is nothing connected to it. (There could be, though.)

Setting up a bridge is easy enough: just Ctrl-click to highlight all the connections you want to bridge, right-click, and select Bridge Connections. Note that if you remove all the adaptors from a bridge, the bridge itself is not automatically deleted; it'll still be present, but will have no adaptors in it!

Word of warning: don't bridge connections between your in-house network and your Internet connection, or you'll open up your inhouse network to the outside world. **BTW**

1394 Networking

If you have a FireWire adaptor in your Windows XP computer you may have noticed that you now have a 1394 Connection in your Network Connections. This means that you can use your FireWire port as a network port in XP. If you have another machine with XP and a 1394 connector, all you need to do is hook the two together with the proper FireWire cables and you have an instant high-speed link. 1394 ports run at 400Mbit/s, twice the speed of 100baseT full-duplex Ethernet. This is a great way to move files between machines or create a quick-and-dirty peer-to-peer local network over a short distance, and requires nothing more than the usual network setup and the proper cables. Check your local computer store for the cables, and make sure you buy one with the correct connectors, as the mini-1394 connectors for notebooks are different than the large ones usually seen on a full-sized PC.

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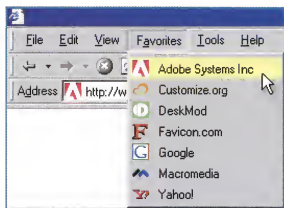


Want your site's bookmark to stand out from the rest? **Trevor Morris** shows how to create a customised "favicon" using Photoshop.

Have a quick look along the links toolbar or bookmarks menu of your Web browser, and what do you see? Dozens of look-alike icons. Yet among them there may be a few that stand out, precisely because they don't use that same generic glyph. Instead, they use a tiny version of their own brand or logo, called a "favicon" (short for "favourites icon"), to uniquely identify their Web page to any 5.0 or later browser.

Yahoo! (the US site, not the Australian version), Google, *The Sydney Morning Herald* and *The Age* newspapers are four such sites. But you don't have to be a major league Web player to use this clever trick. You just need to know how to create an iconic version of your brand and how to make a Web browser use this instead of the default icon.

There's no shortage of dedicated icon editing programs. Two of the best include Microangelo and IconForge, which we've included on this month's cover CD set. But there's plenty to be said for using Photoshop to create icons. For starters, icon editors are often more tedious to work with than Photoshop because they don't support vector shapes, styles or even layers. And as you're already familiar with Photoshop's tools and interface, it's easier to dive right into designing your



Explorer: Internet Explorer displays favicons in the Address bar as well as the Favorites menu.

icon than relearning a new program. Finally, after forking out over \$1,000 for Photoshop, you'd certainly expect to be able to draw icons with it!

The only caveat is that Photoshop can't natively export to the ICO icon file format, so you'll still have to rely on a third party converter to save the icon in the correct format. But there are plenty of freeware applications that can handle that task.

CREATING THE ICON

For this Workshop we set about creating a favicon with the APC logo. Your own site's favicon could be a miniaturised version of your logo or brand, or a totally new graphic.

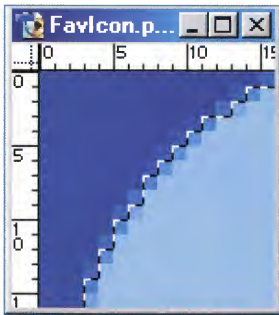
If you have a reference for the source image (we used the APC Web site), perform a screen capture or open the original image. Create a new document using the following settings. Name: Favicon. Width: 16 pixels. Height: 16 pixels. Resolution: 72ppi. Mode: RGB Color. Contents: Transparent.

The canvas can't be any larger than 16 x 16 pixels, or the browser may ignore the icon. Press Ctrl+0 (or double-click the Hand tool) to fit canvas to the screen, which for a canvas this small, will zoom to the maximum level of 1600%. To make it easier to see what you're doing, select Window, Documents, New Window. This new document view will reflect any changes made to the document in real time and real size.

In the main view (the 1600% view), establish a 1-pixel grid by choosing Edit, Preferences, Guides, Grid & Slices. Turn the grid on (View, Show, Grid) and turn Snap off (View, Snap).

Use the Eyedropper tool to sample the dark blue colour (#003399) from the screenshot and then fill the canvas (the current layer). Select the Elliptical Marquee tool and establish the following settings in the Options palette: Feather: 0 px. Anti-aliased: On. Style: Fixed Size. Width: 50 px. Height: 50 px.

Click near the top left corner of the canvas — you should see the top left quadrant of your circular selection — and



Background: use the Elliptical Marquee tool to help create the background.

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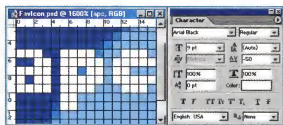
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Foreground: Use the Type tool to create the basic letter shapes required for the logo.

position it so that the circle is about three pixels away from the left edge of the canvas and one pixel away from the top. Use the Eyedropper tool to sample the light blue colour (#8BAEE4) from the screenshot and then fill the current selection.

To quickly set the foreground colour to white, press D to reset the default colours, followed by X to swap the foreground and background colours. Select the Type tool, display the Character palette, and establish the following settings: Font: Arial Black, Style: Regular, Size: 9 pt, Leading: Auto, Tracking: -50, Color: White, Anti-aliasing: None.

Even at the most precise setting of Sharp, the anti-aliasing is too blurry for this very detailed work, so you'll have to anti-alias the letters "by hand", later. Use the Type tool to enter the letters "apc". Not all the pixels will fit, so use the Move tool to position the left-most column of pixels just outside the canvas boundaries. Duplicate the type layer, right-click on the layer in the Layers palette and choose Rasterize Layer. Turn off the original layer type layer.

Select the Eraser tool and set the Brush (or Master Diameter) to 1 pixel, the Mode to Pencil and the Opacity to 100%. Erase the two pixels above and below the centres of both the "p" and the "c". Now use the Pencil tool again with a 1-pixel brush to extend the tail of the "p" by an extra pixel row.

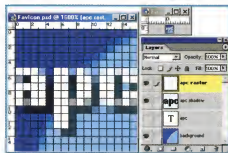
The precise nature of icon art means every pixel counts, and in this case that means doing even the anti-aliasing "by hand." Set the opacity for both the Pencil and Eraser tools to 50%. Use the Pencil tool to place a single pixel on the corners of all the letters as well as one more under the crest of the "a".

To create a drop shadow for the letters, duplicate the current layer and fill it with black while preserving the transparency — assuming that black is still the background colour, the quickest way to do this is to press Ctrl+Shift+Backspace. Move this layer below the white text layer. Select the Move tool and use the cursor keys to move the shadow layer one pixel right and one pixel down. Complete the shadow by changing its layer opacity to 60%.

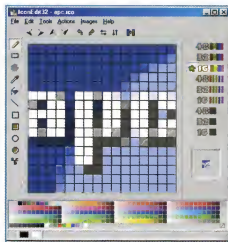
To complete the logo, reselect the original type layer and use the Eraser tool to partially erase the lower centre of the "a" as well as the upper and lower centres of the "p" and "c". Now select the entire canvas and choose Edit, Copy Merged to place a copy of the icon into the Clipboard.

SAVING YOUR ICON

Now you need to convert this image into an icon. One way is to paste the image into an application capable of saving an icon file, such as the icon editors IconForge and Microangelo. We've included a full working version of the nimble IconForge



Fine-tuning: the Pencil and Eraser tools are used to manually anti-alias the logo.



Finished: use on icon editor or image conversion tool to save the image as an Icon File.

on this month's cover CD, plus a 30-day trial version of Microangelo 5.5 suite. There's also a series of Photoshop plug-ins named Icon Builder, which are available for Windows, Mac OS X and Mac OS 9.x; we've included trial versions of these on the CD, although at US\$69 each they're quite expensive.

Whichever application you use, add or select a 16 x 16, 256 colour image format and delete any other selected image formats. Paste the icon image into the editor or plug-in and then save the icon as an Icon File (ICO) named "favicon.ico".

ADDING THE FAVICON TO YOUR WEB PAGE

Now you need to associate the favicon with your Web page. The simplest way is to save the icon with the default name of "favicon.ico" into the root directory of your domain — for example, www.apcmag.com/favicon.ico. An alternative is to name the icon anything you like and include a <link> tag within the <head> section of your Web page(s) that contains the exact URL of the icon to be used. For example:

```
<html>
<head>

    <title>APC Magazine Home Page</title>
    <link rel="shortcut icon" type="image/x-icon" href="http://
    www.apcmag.com/apc.ico" />
</head>
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Each time a visitor bookmarks your Web page, their browser will download your icon and associate it with your site's URL. This association remains in effect until the user empties their browser's temporary Internet cache. www.apcmag.com

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All specials ends on 29th of October 2003.

Access Windows via your Mac

Steven Noble outlines Microsoft's free Remote Desktop Connection Client for Mac OS X.

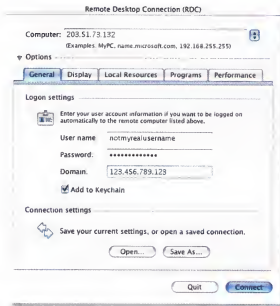
Windows XP Professional's Remote Desktop feature allows you to access Windows software from a Mac, quickly, easily, and at no extra charge. Here's how.

Step one is enabling Remote Desktop or Terminal Services on the PC that will run the Windows software (see APC November 2002, page 158). This PC can be running Windows XP Professional or any Microsoft server since Windows NT Server 4.0, Terminal Server Edition. However, if it is running Windows 2000 or earlier, you won't be able to access the Mac's hard disk from the Windows desktop. Also, Windows applications will not be able to use the Mac's printer if the PC is running Windows NT Server 4.0, Terminal Server Edition.

Download the Remote Desktop Connection Client for Mac OS X from Microsoft Mactopia (<http://microsoft.com/mac>) and install it on any single-processor computer running Mac OS X version 10.1 or later. It requires at least 128MB of RAM.

Ensure both computers are connected to the Internet, and then double-click the Remote Desktop Connection application and click the Options disclosure triangle (if RDC's Mac OS X window is collapsed). Enter the Windows PC's IP address, your username and password and click Connect. The Windows login screen will appear on the Macintosh desktop. Enter the username and password again to access Windows.

After noodling around with the Microsoft Project on my Mac, I was thrilled to find this Windows-only program was completely usable when accessed via RDC. However, the experience might have been different with a slower Mac, PC or network connection, so here's how to adjust RDC's preferences to maximise its performance. Select Log Off from

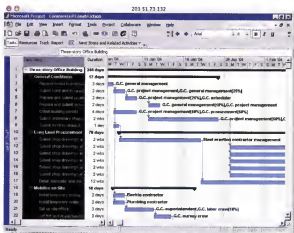


Link up: enter the Windows PC's details and click connect.

the Start bar to return to RDC's Mac OS X window. Now, click the Display tab, and choose the smallest comfortable size for the Windows desktop that will appear on the Mac.

Now, click the Local Resources tab. Unless you're working with a Windows program that provides essential audio feedback, select Do Not Play from the Remote Computer Sound pop-up menu. Last, click the Performance tab, and select the appropriate network connection speed from the pop-up menu. Deselect the options to display the desktop backgrounds, windows in motion, interface animations and themes, as they all consume bandwidth for little benefit.

After optimising the connection settings, click the General tab. If the Mac is secure, put a tick in the Add To Keychain password to store your Windows password on the Mac. Then click Save As to create a file that you can place in your Mac OS X Dock for one-click access to the Windows PC. tiny.cc



Project: let your Mac run Windows apps.

Penguin powerplay

Linux and Unix users can join in the fun thanks to *rdesktop*, an open source Remote Desktop client originally written by Matt Chapman of the University of NSW's School of Computer Science and Engineering. According to the *rdesktop* team, this software requires the X Window System and will run on most Unix-based platforms.

www.rdesktop.org

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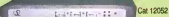
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PC

What's hot in 2003

Justin Kranzl looks into the crystal ball to see what games will have punters reaching for their wallets in 2003, and he has found plenty of quality on offer.

DOOM III (PC)

id Software

This is the title destined to drive many gamers to the hardware shop for an upgrade. And while the Doom name alone is guaranteed to sell gazillions, it's the 3D engine being developed by John Carmack, head boffin at id Software, that's the real show stopper.

Offering the type of detail that makes a GeForce 4 blush and current CPUs whimper, Doom III's in-game graphics are better than many games' pre-rendered scenes. Faces scowl, monsters writhe, and everything is dynamically lit by environmental sources in real time. The move away from frenetic action to a more thoughtful, survival horror experience won't please everybody, but eager mod-makers will be rubbing their hands over this one.

When May 2003

FREELANCER (PC)

Microsoft Games

It's been scheduled to come out for what seems like eons, but 2003 surely is the year that Freelancer finally graces PC screens. Freelancer is much more ambitious than Microsoft's previous space flight sim, Starlancer. A proper story accompanies the action, and when you're out of the cockpit there's still plenty to do, including interplanetary diplomacy, trade

and all manner of skulduggery. But with the game promising a persistent world for limited players, the big question is whether Freelancer can still compete with the flood of online games coming out.

When March 2003

QUAKE IV (PC)

Raven Software

It's drawing a long bow to say this will be out in 2003, but Raven Software has been busily working away on the next Quake since August 2001. id Software handed the rights to Quake IV over to the makers of Jedi Knight II and the Soldier of Fortune series. Set back in the Quake II universe, will this be the last hurrah for the full-tit FPS?

When "Nothing definitive yet," says Raven's Web site.

STARCRRAFT: GHOST (PS2, XBOX)

Blizzard

Despite some criticism that the next StarCraft game will be console-based, anticipation is

running high for this tactical shooter. StarCraft: Ghost gets out of the strategy seat and into the third person shooter genre as you take the protagonist, Nova, through a series of missions and scenarios. The StarCraft name and Blizzard Software's impeccable gaming credentials are enough to make this a sure fire hit.

When Late 2003

HALO (PC/MAC) HALO II (XBOX)

Bungie

The game that helped to sell more Xboxes than any other is back. The graphics engine has been revamped to new heights of detail and lighting. Even better, this time round the story centres on Earth, not some obscure planet. Your character, the artificially enhanced master Chief, returns home to see Earth ablaze. Planetary destruction never looked so good.

Meanwhile, PC and Mac fans continue to keenly await the arrival of the original Halo onto their hard drives. Does it have enough in the tank to seduce gamers worldwide once more?

Given that the game was originally developed with the PC in mind, it's a safe bet.

When Late 2003 for Halo II, early-mid 2003 for Halo



► Quake IV: could be out late this year.

PC XBOX

Splinter Cell

Splinter Cell is a new high water mark for third-person gaming.

3D action titles aren't what they used to be. These days the emphasis is moving away from the "run and gun" style of play in favour of stealth. And Splinter Cell has to be the stealthiest game since Thief. You do have access to an impressive arsenal, but the less corpses you leave behind, the better you're doing.

You play a government-backed "Splinter Cell", a team of one charged with protecting the good ol' American way of life by any means necessary, including knocking off people whose agendas don't coincide with yours. But if you get caught with your hand in the geopolitical cookie jar, don't expect the government to come to your aid.

The game has a gritty, real-world feel. It's set in the year 2004 and looks very similar to the Metal Gear Solid franchise. Another game that Splinter Cell borrows from is Flashback, especially in the third person over-the-shoulder perspective used when aiming weapons.

Splinter Cell gives the graphically adept Xbox a real nudge and, with all the relevant detail enabled, even the highest specced PC

will get a healthy workout. Super sharp light effects vie with exceptional character modelling. The transition effects are also noteworthy and the entire package works well to draw the player deeper into the game.

Despite the similarity in gameplay and appearance to Metal Gear Solid, the makers have resisted the urge to tell the story via cut scenes. Exposition of the story is driven by your progress; the impact of your actions are presented in the form of news updates. This method of story-telling is subtle enough to make hardcore gamers suspend their disbelief, and yet still enthrall the most tentative and inexperienced players.

LEARN TO STALK

Once preliminary training is out of the way, the real fun begins. Ubi Soft has given the protagonist a great deal of flexibility in motion. You can crouch in the shadows, crawl around, and scale pipes upside down while firing a weapon. Just as important as the ability to gun down the enemy is being able to subdue them. If



Sneak-em-up: success in Splinter Cell is determined by brains, not brawn.

you're stealthy enough you will become adept at sneaking up behind an unsuspecting target and throttling them into submission. This isn't as easy as it sounds as the enemy characters are smarter than your average drone. They won't let you just traipse around without taking action. Once alerted, they remain suspicious and don't fall into the common AI habit of "forgetting" an incident.

Splinter Cell also manages to avoid the usual problems with camera angles. The ability to rotate and move the camera eliminates much of the tedium of third person adventuring, and mastery of the camera is vital to success. The tension of leaning flat against a wall, and peeking around it to ascertain the challenges ahead is a highpoint. It's a testament to the strength of the game's engine that you will grow to regard security cameras with as much trepidation as human foes.

In fact your biggest adversary in Splinter Cell is yourself. The noise you generate while moving over different surfaces, your ability to remain out of line-of-sight, and your own level of patience are the keys to success. The more noise you make, the more you are punished by engagements with the enemy. Such engagements are always risky as a single bullet is usually enough to end your mission.

Here is a console game that works admirably well on a PC — although you may wish to get a controller to avoid unnecessary angst. The folk at Ubi Soft cleaned up over Christmas with the Xbox version of this little number. Now is as good a time as any to hop aboard the bandwagon. A classy mixture of everything that's right about third person stealth adventure games, Splinter Cell delivers the goods.

Online www.splintercell.com

Price \$99.95

Verdict **★★★★**



Dark and gritty: Splinter Cell's third person point of view is particularly reminiscent of Metal Gear Solid 2.

RalliSport Challenge

Console games being converted to PC have a less than stellar record. Does RalliSport Challenge, ported across from the Xbox, buck the trend? No. Does it mean it's a bad game? Also, no.

Made by Digital Illusions, the folk behind the seminal Battlefield 1942, RalliSport Challenge offers the kind of action that leaves purists aghast. The focus is on beautiful visuals and arcade-esque simplicity — authenticity comes a distant second. But the sheer fun and looks of the track too far and incur a position reset.

Getting into the game is also a breeze. If you're after the ability to tune your vehicle to the nth degree, look elsewhere — RalliSport has reduced the variables considerably.

What really sells the game are those fantastic graphics. You will need top notch hardware to push the engine, but on maximum detail it's

a work of art. The cars are cleverly detailed, down to the decals, and while the tracks are sparse, there are some interactive objects on offer. Those with sub-godlike PCs will have to throttle back on the visual and sound quality, but thankfully there is ample room to tweak.

The downfall is that despite a wealth of playing modes, including an unusual hill climb option, RalliSport Challenge fails to impress long term. The navigator's calls are often timed too late, and the basic layouts mean you won't need him anyway. The exaggerated and easy handling of the vehicles is also a bit off putting — this is no Colin McRae Rally or WRC II.

If you want a lush, brain dead racing experience you'll love RalliSport Challenge. It



► *On thin ice:* despite lush visuals, RalliSport Challenge fails to impress.

looks fantastic on a decent PC and offers great short-term play. If you're seeking a stiff rally challenge, one that will immerse you completely in the minutiae of the sport, look elsewhere.

Online www.microsoft.com/games/rallisportchallenge

Price \$89.95

Verdict ●●●○

PC

Roller Coaster Tycoon 2

Imagine Sim City for a roller coaster park and you have this game. If you've never played the original Roller Coaster Tycoon, you'll have a ball creating roller coaster designs. Micromanaging your own theme park is a treat, especially when you build roller coasters to panic-inducing size. Even the most action-obsessed gamers will find themselves creeping back to this game. One caveat — if you've played the original, the sequel offers little extra. Apart from a new graphics engine and some gameplay tweaks, this is much the same game.

Online www.rollercoastertycoon2.com

Price \$69.95

Verdict ●●●○



► *Twisted:* build giant roller coasters.

PS2

WRC II Extreme

The new WRC is even better than the original. The improvements in detail and draw distance are so noticeable that you will want to drive over every single one of the 800 satellite-mapped kilometres on offer. The icing on the cake? Six prototype "Extreme" rally cars designed by the developer and WRC manufacturers, and generous helpings of TV footage and commentary on the real star of the show — the exotic locales you race in. Brilliantly executed gameplay and presentation make this compulsory for gamers and rally fans alike. Top marks.

Online www.wrc2extreme.com

Price \$99.95

Verdict ●●●●●



► *Joy-riding:* WRC II has 800km of tracks.

XBOX

Whacked

Fancy some game show action in your own home? Then this game is for you. Whacked offers *Ren & Stimpy*-style hyper-deformed game show mayhem. It looks gorgeous, and just as importantly, it's got a sense of humour. Scoring high on the visual and short-term play scale, this is grand material for a party game. It offers a decent single player game, great scripting, and loads of weapons, cinematics and ads (yes, advertisements) to unlock. It's not going to last as long as Mario Party, but for the older crowd, this one's a winner.

Online www.xbox.com/whacked

Price \$99.95

Verdict ●●●●●



► *Crazy stuff:* Whacked offers game show mayhem.



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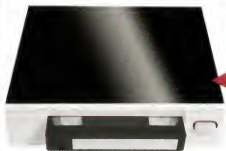
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In the March Issue of **apc**



Personal video

Who needs TIVO? APC looks at the hardware, software and techniques to help you turn your home computer into a personal video recorder.



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PLUS:

Turn Microsoft's Xbox into a Linux-powered superbox; slash Windows' startup time; and how to overclock your Palm.

All that, and plenty more, in the March Issue of APC: on sale February 19.

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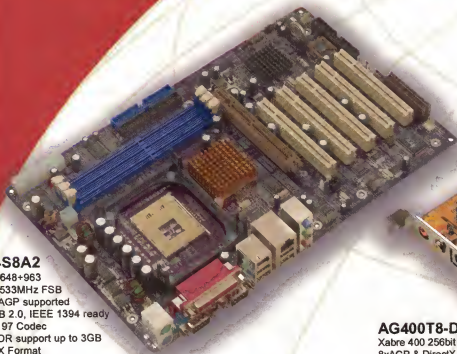
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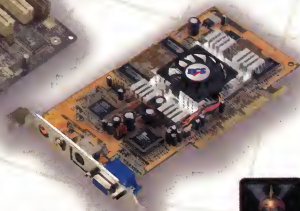
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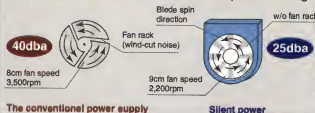
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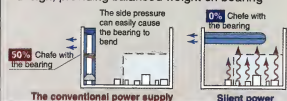
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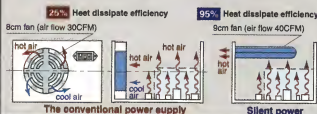
• Reduced Noise level due to new concept of fan design



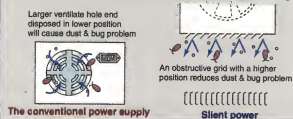
• Prolonged fan lifespan due to this horizontal cooler design, providing balanced weight on bearing



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• Anti-dust & bug design due to cooler fan on the top of electrical elements with oblique pattern design, hence reducing dust accumulation and prevent bug entering



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- ◆ Silver hard anodized aluminum mid case.
- ◆ Removable mainboard tray.
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- ◆ 2x8cm ball bearing & 2x8cm sleeve bearing case fans.
- ◆ 2 x front USB2.0 ports



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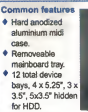
PC-60USB (Silver)

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PC-65USB (Silver transparent panel)

\$369.00 RRP



PC-61USB (Black)

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Common features

- ◆ Hard anodized aluminum mid case.
- ◆ Removable mainboard tray.
- ◆ 12 total device bays, 4x5.25", 3x3.5", 5x3.5" hidden for HDD.
- ◆ 4x8cm sleeve bearing case fans.
- ◆ 2 x front USB ports



PC-7 (Black)

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- ◆ 12 total device bays, 4x5.25", 2x3.5", 5x3.5" hidden for HDD.
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- ◆ 2 x front USB ports



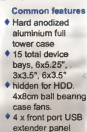
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Economy beige aluminum mid case with plastic front \$190.00 RRP



PC-70USB (Silver)

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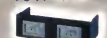
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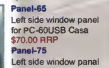
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Panel-75 Left side window panel for PC-70USB Case \$105.00 RRP



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CE-70CL	T003011	STYLUS Colour 900 3-Colour	\$24.00
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EPSON Stylus 820/colour Vile	12	23-BKL
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CANON BJC-3000/6000/8000 Series	3x8	47-CLR
HP Colour Desk Jet 300/400/500 Series & Olivetti	3x12	14A-CLR
HP Colour Desk Jet 600C/660C/690C Series	3x12	14B-CLR
HP Desk Jet 850C/855C/870C/1000C Series	3x3	30A-CLR
HP Desk Jet 710/720/890/900 Series	3x3	30B-CLR
EPSON Stylus Colour PRO/XL	3x4	16-CLR
EPSON Stylus 820/colour Vile	3x12	24-CLR
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	3x12	34A-CLR
EPSON Stylus Colour 440/460/480/640/660/700/740/760/900	3x12	34B-CLR
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Age of Mythology

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IBM R3i

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KYOCERA



FS-1010

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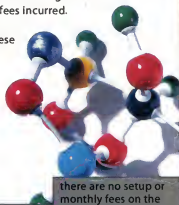
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- ◆ ASUS A7V8X M/B, with Raid
- ◆ KT400A/AGP8x/Firewire/3DDR/6PCI/USB2
- ◆ 256 MB DDR RAM
- ◆ 40GB 7200 rpm Hard Disk
- ◆ 64MB GeForce Graphics Card
- ◆ ASUS 48x40x12 CD-RW
- ◆ Pioneer 16x DVD Rom Drive
- ◆ Integrated Realtek ALC650 6-channel audio, for 5.1 sound system
- ◆ Internet keyboard
- ◆ Optical Mouse
- ◆ MS Windows XP home
- ◆ Free one month internet access with AOL

* All Systems come with (unless specify): Silver ATX Case, Integrated 3D Soundboard, 56k V.92 PCI Fax/Modem, 1.44 Floppy Disk Drive, 180W Amplifier Speakers.

THIS MONTH SPECIAL

ADD A MONITOR TO SYSTEM

BenQ: 15" LCD \$399, 17" LCD \$999, PHILIPS: 17" \$236, 15" LCD 1505F \$649, 17" LCD 17082B \$1178, LG: 17" \$250, 17" Flat \$300, VIEWSONIC: 17" \$210, 15" \$165, Phillips: 17" 107T Flat \$270, 15" Flat \$740, Hitachi: 17" LCD \$399, 17" CM615 \$273, CM621 (F) \$305, 15" CM721(F) \$565, 21" CM827 \$1270, 15" LCD \$695, LG: 15" LCD \$548, SONY: 15" LCD \$748, 17" LCD \$1399,

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Complete Power Protections

FEBRUARY 2003

6-way surge
board+
tel protection



\$43

Sola 330
400VA
Only \$119

New!

Sola 305
Affordable Power
Protection for
PC's and SOHO
applications



Sola 305 300VA

\$150

Sola 305 550VA

\$199

All Sola UPSs come with a two year replacement warranty

All SOLA UPSs are specifically designed for Australian applications with multiple Australian sockets, eliminating the need for messy adaptors. The product is tested and approved to Australian EMC and Safety Standards and carries both the C-Tick and A-Tick marks indicating compliance to the relevant Standards.

Sola 325

400 - 1000VA
Intranet ready advanced power protection
for PCs, workstations and smaller servers

All controls and indicators are located on the front panel including the SOLA PowerSteady™ Buck/Boost Indicator which advises when high and low line conditions occur. Batteries are hot swappable and user replaceable for cost effective maintenance in the future.

Sola 325		
400VA	\$310	
750VA	\$520	\$5.4 p/w
1000VA	\$688	\$7.13 p/w



Sola 520

750VA to 2.25kVA UPS
Pure, sinewave power protection for
networking computer.

SOLA 520 is one of the most reliable UPSs in its class. Built-in self-diagnostic routines enable you to spot, diagnose and respond to power problems as they occur, helping safeguard your equipment against premature breakdown, and your data against power-related corruption or loss.

Sola 520		
750VA	\$656	\$6.8 p/w
1050VA	\$974	\$10.1 p/w
1425VA	\$1,341	\$13.92 p/w
1800VA	\$1,830	\$18.58 p/w
2250VA	\$2,198	\$22.31 p/w



UPS Series

Sola 620 Rackmount
Online UPS
1KVA - 3KVA



It is ideally suited to protect your LAN/WAN equipment. It's inbuilt BestDock™ communication slot for the optional Bestlink™ SNMP/Web adaptor, allows easy interface and monitoring. It also features inbuilt TVSS to protect the network, as well as new temperature compensated battery charger to extend battery life.

Sola 620		
700VA	\$1,044	\$10.83 p/w
1000VA	\$1,496	\$15.54 p/w
1500VA	\$2,027	\$20.58 p/w
2000VA	\$2,767	\$27.13 p/w
3000VA	\$4,002	\$37.86 p/w

Sola 625 Online UPS
700VA - 6000VA



Sola 625
700VA - 6000VA
Online double conversion
UPS for mission critical
applications. Provides
constant
voltage (240V) regardless

of input voltage.

User Friendly, Informative LCD Display The revolutionary 625 includes a user friendly LCD that is normally only found on considerably larger UPS systems. The LCD display panel makes it extremely easy to configure your UPS to fit your application. In addition, the 625 has the capacity to monitor your equipment using different tests

Sola 625 700VA	\$1,044	(\$10.83 p/w)	1000VA	\$1,496
				(\$15.54 p/w)
			1500VA	\$2,027
				(\$20.58 p/w)
			2000VA	\$2,767
				(\$27.13 p/w)
			3000VA	\$4,002
				(\$37.86 p/w)
			6000VA	\$6,233
				(\$54.65 p/w)

**KVM & CONNECTIVITY EXPERT** *Since 1981***MasterView SOHO KVM Switch****CS-12C \$150**
(inc. Cable)**CS-14C \$230**
(inc. Cable)**CS-82A \$99***
(inc. Cable)**CS-84A \$189**
(inc. Cable)**Special!****2 / 4 PORT COMPACT KVM SWITCH**

Controls and monitor 2 PC system from 1 single console
Easy to operate - PC selection via push button or hot keys
Keyboard and mouse emulation for error free PC booting
Supports 1920 x 1440 resolution

2 / 4 PORT DESKTOP KVM SWITCH

Controls 2 PC system from 1 single console
Auto scan function to monitor PC operation
Keyboard and mouse emulation for error free PC booting
Superior video quality
* Until 30/12/02 or stock finished

MasterView PRO KVM Switch**CS-138A \$650****CS-1008 \$949****CS-1016 \$1,399****NEW!****CS-1208L \$3,999****8 / 16 PORT MASTERVIEW PRO KVM SWITCH**

Control 8/16 PCs from 1 single console
Daisy-Chainable to control up to 128/512 CPUs
LED display for easy status monitoring
Build in OSD (On Screen Display)
No software required
Superior video quality - up to 1920 x 1440

8 PORT LCD KVM SWITCH CONSOLE

1-U high 19" rackmountable unit
Single LCD console drawer with build-in KVM Switch
Daisy-chainable - control up to 256 PCs
Two level password protection - 1 admin & 4 users
15" RGB analog LCD display
Supporting high XGA resolutions of up to 1024 x 768

Video Splitter / Video Converter**VS-92A \$88****VS-94A \$120****VS-98A \$180****VS-1024 \$330****2 / 4 / 8 PORT VIDEO SPLITTER - 250MHZ**

1 video input to 2/4/8 video outputs
Transmission distance up to 65m
Suitable for SVGA, VGA, and multisync monitors
Daisy-Chainable for more outputs
Ideal for public broadcasting; remote monitoring, and training facilities

VGA to TV Converter

True Plug-and-Play
No software required
Scan rate up to 100Hz
Supported for 640 x 480 resolution
Supports NTSC, PAL and SECAM*


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FEBRUARY 2003

A STYLISH SOHO BRAND

**GME-421 \$54.95****Web Cruiser****(4 Direction Scrolling Optical Mouse)**

4 directional scroll ball allows you to scroll up, down, left and right
Superior optical sensor tracks movement 1500 times per seconds to provide smooth tracking on any surface
On screen digital zoomer magnifies any area on screen

**GME-221 \$44.95****Mini Mouse****(Mini USB Optical Mouse)**

Light and portable - ideal for mobile professional users
Superior optical sensor tracks movement 1500 times per seconds to provide smooth tracking on any surface
Compact design to save precious space in mobile work area

**GFR-201 \$89.95****Hi-Speed USB2.0****Flash Card Reader**

Hi-Speed USB2.0 Certified - download 128MB in 30 seconds
Supports MicroDrive up to 1GB
CompactFlash Type II Spec v1.2
Remarkable high-speed digital image and data transfer to PC

**GUF-202 \$169.00****USB2.0/Firewire Combo CardBus**

Upgrade notebook PC or Mac to USB2.0 and Firewire
2 x USB type A ports
1 x Firewire 6pin port and 1 x Firewire 4pin port
USB2.0 and IEEE1394, 1394OHCI v1.0
1394a v2.0 compliant

**GHE-125C \$149.00****ION 2.5" HDD Combo Enclosure**

Easy to install; available in 20, 30, 40 and 60 GB sizes
1 x USB mini-B port; 1 x Firewire 4pin port
Firewire transfer rate up to 400Mbps; USB transfer rate up to 480Mbps

**GHE-135C \$199.00****ION 3.5" HDD Combo Enclosure**

Easy to install; available in 20, 30, 40 and 60 GB sizes
1 x USB mini-B port; 1 x Firewire 4pin port
Firewire transfer rate up to 400Mbps; USB transfer rate up to 480Mbps

**GCS-62 \$109.00****2 Port MiniView
Micro KVM Switch**

The smallest 2 port KVM switch available
Molded-in cables makes simple to set up
Port selection through convenient Hot Keys
PS/2 mouse emulation for error-free boot-up

**GUH-204 \$89.00****4 Port USB2.0 Mini Hub**

4 x USB2.0 external ports
Over-current surge protection
LEDs allows for easy status monitoring

**GBU-301 \$179.00****Bluetooth to USB Adapter**

Allows any computer with USB connectors to become a Bluetooth enabled computer

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VENQUA / Miscellaneous

**UC-100KM \$65****USB to PS/2 Keyboard & Mouse Converter**

Work with any USB compliant system
USB powered

**USB-110T \$149****USB to Ethernet Adapter -10/100BaseT**

10/100 Mbps Ethernet compliant
Bus powered

**UC-232A \$59****USB to Serial Adapter**

Allows easy interact with USB PCs
Supports RS232 serial interface

**AS-152P \$39****2 Port Compact Parallel Auto Switch**

Operates in 1 PC to 2 printer;
or 2 PCs to 1 printer mode
No external power required

**FWC-031/032 \$75/\$69****Firewire Card 4/2 Port**

Provides 4/2 downstream ports
400 Mbits/sec data throughput

**UFC-2123/2223 \$129/\$189****USB1.1 / Firewire Combo Card**

3 x USB2.0 ports at 480 Mbps
3 x Firewire 1394 ports at 400Mbps
Compatible with OHCI

**UFB-P235 \$79****USB2.0 PCI Card + 3.5"/5.25" Front Bay**

2 Port USB PCI + 3 Port USB2.0
Front Bay
Auto speed selectable USB TypeA
downstream ports

**E94-PCM2 \$88****2 Port Firewire PCMCIA Card**

Supports IEEE1394-1995 standard
Fully compliant 32-bit CardBus spec.
PCMCIA Type II

**UC-2000L \$213****USB Docking Station**

Connect all standard desktop
peripherals to notebook
Contains USB, serial, parallel,
mouse, keyboard and ethernet
port

**UIR-001 \$119****USB to IrDA Converter**

Compliant with USB v1.1 and
IrDA v1.0
Supports SIR & FIR from 115K
gdbps to 4Mbps rate

**UCR-MS \$38****Memory Sticker Reader**

Data transfer rate 850K-1.1 Mbps
Supports Memory Stick Card;
USB v1.1

**UCR-51 \$75****5-in-1 Card Reader**

- Compact flash, Smart media
- Micro drive, Multimedia
- SD Media

**SCF-SB2 \$39****System Blow Fan**

Maintain cool air circulation and
protect PC from extreme heat
Fit in any 5.25" bay of PC

PRINTER SERVER

**2S-7117 \$229**
Network Print Server

Print server with 1 fast parallel port
Standard 10 Mbps Ethernet
Interface (UTP)

**2S-7337 \$329**
Network Print Server

Print server with 3 fast DMA parallel
port
Auto sensing 10/100Mbps Ethernet
Interface (UTP)



Networking & Storage Solutions

FEBRUARY 2003

New generation Gigabit product

Network adapter
32 bit 10/100
High performance



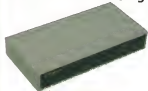
\$16.00

5 port switch
10/100 auto sensing



\$60.00

8 port switch
10/100 auto sensing



\$75.00

CD Library
USB 150 CDs Library
/MANAGEMENT



\$185.00

PCI Bus Adapter
(32/64-bit)



\$105.00

(Gigabit) connections to Servers
& Workstations

1 PORT GIGA
+ 8 10/100 SWITCH



\$375.00

A workgroup solution helping to
increase network throughput for
increased server to client response

2 PORT GIGA
+ 8 10/100 SWITCH



\$495.00

19" rack-mountable
Supports Virtual Local Area
Networking

External Case

Easy way to make back-up copies of your files

USB1.1

Pocket Boy For 2.5" HDD
Support
PC & Mac



\$60

USB2.0

Pocket Boy For 2.5" HDD
Support
PC & Mac



\$85

FIREWIRE

Pocket Boy For 2.5" HDD
Support
PC & Mac



\$90

Crystal case For 3.5"HDD
Support
PC & Mac



\$80

Crystal case For 3.5"HDD
Support
PC & Mac



\$120

Crystal case For 3.5"HDD
Support
PC & Mac



\$130

5.25" Sky case
For CD-ROM/CD-RW



\$120

5.25" Sky case
For CD-ROM/CD-RW



\$135

5.25" Sky case
For CD-ROM/CD-RW



\$135

SMC

Network adapter
WOL, high performance



\$18.00

24 Port Switch
Ultra-fast high-performance
Auto-negotiating



\$525

24 Management Switch
Ultra-fast high-performance
stackable
2EXT slot support 100FX,
1000T/SX/LX



\$1725



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KINGMAX®

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Memory for Next Generation Today

FEBRUARY 2003

Kingmax 10/100 Dual Speed Hubs



- **KVM-K1025K** KVM 2-port Auto Switch Kit **\$130.00**
With / Two sets of High Grade Cable (L=1.2m)
Use one keyboard, monitor and mouse to control two computers
Support 95, 98, 98E, 2000, 2000ME, Win NT, Unix and Linux.
- **KVM-K1045K** **\$160.00**
KVM-K1045K KVM 4-port Auto Switch
Use one keyboard, monitor and mouse to control two computers
Support 95, 98, 98E, 2000, 2000ME, Win NT, Unix and Linux.
- **KA/1.2MKVM** **\$40.00**
1 set High Grade Cable (L=1.2m)

Kingmax Networking First 3 month On-site Replacement

■ KH324A Metal Case Rackmountable

24 port auto-negotiation 10/100Mbps
IEEE802.3 10Base-T, 802.3u 100Base-TX
RJ-45 ports and one uplink port provided
Dual speed hubs, Metal Case
Stackable to 6 units, PnP, Internal Power



Services area (NSW, Mel, Qld, S.A., W.A., N.T.)
All hubs and switches

\$310.00



Switching Hubs

- **AKS3205** 5 Port auto-negotiation 10/100Mbps **\$85.00**
Metal Case
Dual speed SOHO switch, metal Case
RJ-45 ports and one uplink port provided
- **AKS3208** 8 port auto-negotiation 10/100Mbps **\$110.00**
Metal Case
Dual Speed SOHO switch metal Case
RJ-45 ports and one uplink port provided
- **AKS-3216** 16 port auto-negotiation 10/100Mbps **\$250.00**
Metal Case
One uplink port for easy link to another switch
11" Desktop or Rack-Mount installation
- **KSS4316** 16 Auto-negotiation 10/100Mbps **\$470.00**
Metal Case
Virtual Lan support network Security
Port Trunking for up to 800Mbps link
Optional 100 Base-FX module
- **KSS4324** 24 Auto-negotiation 10/100Mbps **\$650.00**
Metal Case
Virtual Lan support network Security
Port Trunking for up to 800Mbps link
Optional 100 Base-FX module

AKC-305D



10/100 PCI Ethernet Card
10/100Mbps Auto sensing
Five years warranty

\$17.00

Kingmax TinyBGA Memory



- **DDR SDRAM**

MPXB62D-68KX TinyBGA	256MB PC3200 400MHz	\$170.00
MPMB62D-68KX TinyBGA	256MB PC2700 333MHz	\$156.00
MPDB62D-68KX TinyBGA	256MB PC2100 266MHz	\$154.00
SuperRAM (TSOP)	512MB PC2700 333MHz	\$278.00
- **168Pin ECC PC-133 SDRAM**

MP1B63S-68KX TinyBGA	256MB PC133 Mhz ECC Register SDRAM	\$130.00
MP1C63S-68KX TinyBGA	512MB PC133 Mhz ECC Register SDRAM	\$195.00
MP1D63S-A43 TinyBGA	1GB PC133 Mhz ECC Register SDRAM	\$530.00
- **DDR ECC Register**

MPNC22D-38KX TinyBGA	512MB DDR2100 ECC Register	\$360.00
MPND42D-AAKX TinyBGA	1GB DDR2100 ECC Register	\$980.00
- **200pin DDR SO-DIMM**

MSDA82D-68KX TinyBGA	128MB PC2100 266MHz	\$90.00
MSDB62D-68KX TinyBGA	256MB PC2100 266MHz	\$170.00
MSDC22D-38KX TinyBGA	512MB PC2100 266MHz	\$385.00
- **144Pin PC133 SO-DIMM**

MSGA82S-68KX TinyBGA	128MB PC133 SDRAM 133Mhz	\$70.00
MSGB63S-68KX TinyBGA	256MB PC133 SDRAM 133Mhz (1.18")	\$125.00
MSGC63S-68KX TinyBGA	256MB PC133 SDRAM 133Mhz	\$120.00
MSGC23S-38KX TinyBGA	512MB PC133 SDRAM 133Mhz	\$220.00

KingmaxFlash Memory



- **KCF064MB** 64MB Compact Flash card **\$51.00**
- **KCF128MB** 128MB Compact Flash card **\$87.00**
- **KCF256MB** 256MB Compact Flash card **\$160.00**
- **MMC064M** 64MB Multimedia card **\$88.00**
- **MMC128M** 128MB Multimedia card **\$180.00**
- **SD64MH** 64MB Security Data **\$95.00**
- **SD128MH** 128MB Security Data **\$167.00**
- **PD64MB** 64MB USB Pen Drive **\$63.00**
- **PD128MB** 128MB USB Pen Drive **\$109.00**
- **MS64MB** 64MB Memory Stick for Sony **\$90.00**
- **MS128MB** 128MB Memory Stick for Sony **\$147.00**

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Special!

ADSL MODEM

ADSL Modem NB1200

USB ADSL modem + **FREE** Microfilter kit designed for home and small offices



\$194

USB LAN Key

10/100Mbps NP1010

Plugs onto USB port to provide instant Ethernet connectivity.



\$55

Gigabit Copper Network Card (32-bit) NP1800

This 32-bit PCI Gigabit over Copper adaptor includes the newest networking technologies, such as VLAN, VLAN tag insertion support, and Auto MDI-II/MDI-X crossover capabilities, multicasting and has a wide range of operating system support.



\$139

Networking & Communication



Switch

- **5-Port 10/100Mbps SmartSwitch NP2005** 5-Port mini N-Way high speed switch. Auto detect full or half duplex. **\$115**
- **8-Port 10/100Mbps SmartSwitch NP2008** 5-Port mini N-Way high speed switch. Auto detect full or half duplex. **\$173**
- **8-Port 10/100Mbps ProSwitch NP2080** 8 Port N-Way high speed FAST Ethernet switch, auto detect full or half duplex, store and forward architecture, MDI Uplink Port to cascade additional switches. In-built 240VAC power supply. **\$217**
- **16-Port Pro Switch NP2160** 16 high-speed 10/100 ethernet ports with store & forward switching, back pressure flow control and address learning capabilities. **\$537** *5.57 p/w
- **24-Port Pro Switch NP2240** 16 high-speed 10/100 ethernet ports with store & forward switching, back pressure flow control and address learning capabilities. **\$717** *7.45 p/w
- **Gigabit Pro Switch NP2480** 26 port ProSwitch provides 24 x 10/100Mbps Fast Ethernet and 2 x 1000Mbps Gigabit **\$1,654** *16.79 p/w

ADSL



- **Cable/DSL Wireless Router/4-port switch NB3000** Wireless router for ADSL and Cable modems. Transmits speed at 11Mb and Wireless range up to 91 metres indoors. In-built 4 port 10/100 switch. Includes 128-bit WEP encryption to ensure privacy. **\$439**
- **Cable/DSL Firewall Router/4-port switch NB3100** Advanced Firewall Router for ADSL and Cable modems. Supports Denial of Service and URL Filtering. Supports VPN*, IPSec and PPTP pass through. Can block all Java and Active X code as well as cookies. Built-in 4-port 10/100 switch. **\$275**
- **Cable/DSL VPN Router/4-port switch NB3200** VPN Router for ADSL and Cable modems. The NB3200 provides full IPSec VPN tunnelling* and firewall protection for your cable or ADSL modem. True End Point to End Point IPSec VPN solution with 3DES encryption. Built-in 4-port 10/100 switch. **\$412**
- **ADSL Modem/Router/4-port switch NB3300** ADSL modem and router in one. Ethernet interface with 4 port 10/100 switch. Supports PPPoA, PPPoE and Bridged protocols. NAT, IP Port filtering, IPSec passthrough, Remote Access, DMZ hosting, DHCP. **\$398**



Wireless

- **Wireless LAN Access Point NP7000** NetComm's Wireless LAN with bridging Access Point is high speed 11Mbps-IEEE802.11b access to network resources. **\$398**
- **PCMCIA Wireless Card NP7030** Wireless LAN PCMCIA card Supporting 11Mbps-IEEE802.11b standards incl 64 & 128bit WEP encryption. **\$163**
- **USB Wireless LAN Adapter NP7040** NetComm's USB Wireless LAN Adapter. Supporting the latest 11Mbps-IEEE802.11b standards incl 64 & 128bit WEP encryption. **\$181**
- **CompactFlash Wireless NP7050** Wireless LAN Compact Flash Card provides LAN access for PDAs (Personal Digital Assistants) from any environment equipped with an 11MPb's - IEEE802.11b standards incl. 64 & 128bit WEP encryption. **\$242**

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Video Graphic Solutions

ASUS Add on Card



V9180 TD

\$244

GeForce4 MX400-8X, AGP 8X, 64MB DDR, DVI, Dual VGA, TV-out

- × NVIDIA® GeForce4 MX440-8X GPU
- × High-speed 64MB DDR video memory
- × High-quality TV output for big screen gaming or presentations
- × 60-240 Hz Vertical Refresh Rate
- × Include TV-out Connector

GeForce4 Ti 4200-8X, AGP 8X, 128MB DDR, TV-out, DVI, 2nd VGA

- × NVIDIA® GeForce4 Ti4200-8X GPU
- × High-speed 128MB DDR video memory
- × Up to 2048 × 1536 resolution
- × Include TV-out Connector
- × Include PowerDirector Pro, ASUS PowerDVD XP, Media Show, and popular 3D games



V9280s/TVD(Super Fast)

\$525

V9280TD

\$439



Hercules Add on Card

3D Prophet 9700 PRO

\$759 \$7.88 p/w



- × Incredible 325MHz core / 310MHz RAM clocks
- × 8 pixel-pipelines architecture for increased rendering power
- × 256-bit DDR RAM interface, giving 18.5GB/s RAM bandwidth
- × 128MB DDR memory to fill the latest games with masses of textures
- × A large RAM buffer improves DirectX® 9 & 8 Pixel & Vertex Shaders
- × 128MB on-board helps 3D Prophet 9700 Pro to accelerate 3D games on 2 screens
- × This wide buffer gives access to FSA and anisotropic filtering even in high resolutions
- × HyperZ™: Intelligent memory-bandwidth-saving technology
- × AGP 8X / 4X / 2X support for maximum performance with the latest motherboards

3D Prophet 9000 PRO 128MB

\$363



- × TV-VIDEO output to display up to 1024x768 @ 60Hz & PAL TV out
- × VIDEO IMMERSION™ technology for high quality playback
- × DVD movies with minimal CPU resources
- × FULLSTREAM™ technology for accelerated hardware de-blocking of RealVideo™ video streams
- × Hardware HDTV decoder (iDCT & Motion Compensation), MPEG-2 decoder, Adaptive Per Pixel De-interlacing
- × HYDRAVISION™ flexible management of the display on multiple screens
- × SMARTSHADER™ technology for full DirectX® 8.1 hardware support in games (Pixel Shaders 1.4 & Vertex Shader 1.1) and OpenGL® 1.3
- × HYPERZ™ bandwidth-saving technology
- × CHARISMA ENGINE™, accelerator engine for Transformation, Clipping & Lighting
- × SMOOTHVISION™ technology to improve image quality, featuring Anti-Aliasing, Anisotropic filtering
- × TRUFORM™, the revolutionary solution to smooth 3D shapes edges

3D Prophet 9000 128 MB

\$275



- × 128MB of DDR RAM for impressive performance in all graphics
- × applications, especially for mass multitasking
- × SMARTSHADER™ technology for full DirectX® 8.1 hardware support in games (Pixel Shaders 1.4 & Vertex Shader 1.1) and OpenGL® 1.3
- × HYPERZ™ bandwidth-saving technology
- × CHARISMA ENGINE™, accelerator engine for Transformation, Clipping & Lighting
- × SMOOTHVISION™ technology to improve image quality, featuring Anti-Aliasing, Anisotropic filtering
- × TRUFORM™, the revolutionary solution to smooth 3D shapes edges

Leadtek Add on Card

WinFast A170 DDR TH

- × NVIDIA GeForce4 MX 440 GPU
- × 64MB DDR Memory
- × 2 dual-rendering pipelines
- × AGP 4X/2X and AGP Texturing Support
- × High-quality HDTV/DVD playback
- × Integrated TV Encoder Supporting 1024x768 resolution
- × Microsoft® DirectX® 8.X and OpenGL® 1.3 Optimizations and Support



\$129

WinFast A180 DDR TH

- × NVIDIA GeForce4 MX 440-8X GPU
- × 64MB DDR Memory
- × AGP 4X/2X and AGP Texturing Support
- × High-quality HDTV/DVD playback
- × Integrated TV Encoder Supporting 1024x768 resolution
- × Microsoft® DirectX® 8.X and OpenGL® 1.3 Optimizations and Support



\$209

WinFast A170 DDR TH MyVIDD with 128MB

\$259

WinFast A280LETD 128mb Ti4200-8X VIVO

- × NVIDIA GeForce4 Ti 4200 GPU with AGP 8X
- × InfiniteFX™ II Engine for programmability
- × Dual programmable Vertex Shaders
- × Lightspeed Memory Architecture™ II
- × 64/128MB high-speed DDR Memory
- × Memory bandwidth up to 9GB/sec
- × Vivid NTSC/PAL TV-out support with flicker filter
- × On-board TV-out support up to 1024x768 resolution
- × Microsoft® DirectX® 8.X and OpenGL® 1.3 Optimizations and Support
- × Including WinFast/D7WinFox II, Cult 3D, Colorful Embedded, Colorful Visual, Colorful Bright, AQUANOX™ MASTER REALITY, Tom Clancy's Rainbow Six - Rogue Spear and 6 via demo game.



\$375

Leadtek MX460 64M

\$155

Leadtek MX460 64M with VIDD

\$195

WinFast TV2000 XP Tuner

- × Supports PIP (picture in picture) function
- × One for live and the other for captured program
- × Supports MPEG1/MP2/2 Video codec and MPEG3 audio codec configuration to get the smaller file size for capturing
- × Supports de-interlaced function to get high quality of motion video
- × Watch high-quality TV with dttb-stereo in full screen or a scalable window
- × Bridging video to PC from VCR, camcorder, DV/HD/DVD player
- × Include convenient and cool remote control
- × Support video mail communication



\$126



COMPUTER WAREHOUSE SYDNEY

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Complete Monitor Solutions

FEBRUARY 2003

SONY

17" CPD230 MONITOR



Special!

- 16" viewable
- 0.24 - 0.25mm aperture grille pitch, up to 1600 X 1200 @ 60Hz max resolution, Windows & Mac compatible,

\$599

\$6.22 p/w



SONY 19" CPD420 TRINITRON CRT MONITOR

- 18" viewable
- 0.24 - 0.25mm aperture grille pitch, up to 1920 X 1440 @ 60Hz max res, Windows 95/98/2000/NT/Me & Mac compatible

\$869

\$9.02 p/w



SONY SDMS51 15" FLAT PANNEL LCD

- 15" screen size, 1024 x 768 max res,
- 0.297mm pitch, 300:1 contrast, 200 cd/m2 Luminance
- Light grey front bezel with dark grey rear bezel

\$889

\$9.23 p/w

SONY 17" SDMS71 FLAT PANNEL LCD



- LCD SIZE: Diagonal 17.0"
- NATIVE RESOLUTION: 1280 x 1024
- PIXEL PITCH: 0.279mm
- COLOURS: 16.78 million
- CONTRAST RATIO: 400:1 (max)

\$1499

\$15.57 p/w

PHILIPS PH150S3F 15" LCD MONITOR



Special!

- 15" Visible, Effective viewing area 304.1 x 228.1mm
- PIXEL PITCH: 0.297 x 0.297mm
- RESOLUTION: 1024 x 768 pixels

\$649

\$6.74 p/w



PHILIPS PH170B2B 17" LCD MONITOR

- 17" Visible, 337.9 X 270.3mm effective viewing area
- TUBE: 0.264mm pitch,
- 1280 X 1024 max resolution
- SCAN RATE: 30-82kHz (horizontal), 56-76kHz (vertical) scan range

\$1175

\$12.20 p/w

PHILIPS PH107T 17" REAL FLAT CRT MONITOR



- 6" visible,
- 0.25mm dotpitch, 1280 x 1024 max res, 30-71kHz(h), 50-160kHz
- Win 95/98/NT 2000 compatible

\$279



PHILIPS PH109P 19" REAL FLAT CRT MONITOR

- 19"(18" viewable) colour monitor, 0.24mm grille pitch
- 1920 X 1440 max res,
- 30-111kHz(h) 50-160kHz
- (v) scan rate, Win 95/98/NT/2000 compatible

\$899

\$9.34 p/w



HITACHI Inspire the Next CM721 19" Flat Screen

- 0.20mm horizontal dot pitch,
- Max Resolution: 1600 x 1200 @ 75Hz
- Black matrix CRT with Invarshadow mask,
- Anti-static, anti-reflection coating,

\$565



HITACHI Inspire the Next CML171SXW 17" Multimedia TFT LCD

- SXGA (1280x1024) resolution,
- 16.77 million colours,
- Auto adjust function
- Built-in microphone, speaker

\$999

Special!

L&L Electronics 17" E700B Studioworks Monitor



- Screen Size: 17" (16.0"V.I.S)
- Maximum Resolution: 1280x1024 @60Hz
- Surface Treatment: ARAS & Anti-Glare Coating

\$300

L&L Electronics 15" L1510S LCD Monitor



- 15.0" TFT-LCD Super Slim Bezel
- 1024 x 768 @ 75Hz
- Video Signal Type: Separate, RGB Analog
- Wide Viewing Angle : 90°(H)/120°(V)

\$689



SAMSUNG DIGITAL Syncmaster 171N TFT

- 17" Viewable Area
- 250 cd/m2 Brightness
- 400 :1 Contrast Ratio
- 140/120 Viewing Angle(H/V)
- 25 ms Response Time
- Analog Interface
- 1280x1024 Max. Resolution

\$1525

\$15.48 p/w



SAMSUNG DIGITAL Syncmaster 753DFX MONITOR

- 17"(16" Viewable)
- 0.20mm dot pitch (horizontal)
- 1280 x 1024 @ 66Hz Maximum Resolution
- DynaFlat - Infinitely Flat Tube
- Smart III surface treatment

\$279



ViewSonic E70-17" CRT MONITOR

- 16" visible
- 0.24mm horizontal dot pitch
- 0.27mm diagonal dot pitch
- Displays resolution of 1280 x 1024: 1024 x 768 optimal resolution at 87Hz

\$205



ViewSonic VG500 15" LCD

- 15" LCD
- AutoTune function automatically
- Displays resolution of 1024 x 768;
- Silver and Black Color with Speaker
- 260 nits of brightness and a 450:1 contrast ratio

\$729

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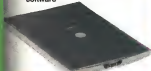
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Canon LIDE20

- 600 x 1200 dpi
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- Connect to Mac or PC
- USB Interface
- Powerful Imaging and OCR software



\$152

EPSON Perfection 1260/ 1260 Photo Scanner

- Up to 1,200 x 2,400dpi w/ Micro Step Drive
- Scan size: 218 x 297mm (A4 + Letter)
- Colour: 24-bit (16.7 million colours) external, 48-bit (281,474 billion colours) internal
- Speed (Draft mode): A4 300dpi; 43 sec Monochrome (Bi-level) & Colour Interface: USB 1.1 (Performance eqvt to USB 2.0 F)
- 35mm unit for slides and films for Perfection 1260 photo



Perfection 1260 1260 Photo Scanner

\$202

\$259



Scan Jet 3500C

- Up to 1200 dpi end 48-bit colour preview scans in as little as 10 seconds
- HP's exclusive dual sensor CCD technology
- HP's CCD technology enables convenient and accurate scanning of 3-D objects



\$218

i320

- Print Resolution up to 2400x1200 dpi
- Up to 10ppm black and white and 7ppm colour
- 6"x4" borderless photo printing
- Supports Exif Print
- Advanced Microfine Droplet Technology for sharper prints

Canon Special!



\$159

Canon S820

- Up to 4 pages per minute
- Up to 2400 x 1200 print resolution
- Colour lasts up to 25 years using Canon's Photo Paper Pro
- Create full-bleed A4 borderless photos
- Replace all six ink individually



\$569

LBP-1210

- High resolution (600 x 800 dpi or 2400 x 600 dpi with Automatic Image Refinement (AIR))
- High speed printing (14 ppm)
- Delivers first print in 10 seconds
- Toner saving mode
- 250 sheet paper capacity
- Canon Advanced Printing Technology (CAPT)



\$519

ImageCLASS MPC600F

- All colour functions: Printer, Fax, Scanner and Copier with Automatic Document Feeder
- High-speed printing (17ppm black, 12 ppm colour)
- Super G3 (33.6 kbps modem) - 3 secs per page fax transmission
- High print resolution (up to 2400 x 1200 dpi)
- High-speed copying (17 cpm black, 10 cpm colour)



\$775

STYLUS C82

- Up to 5760 x 1440 optimised dpi
- printing up to 22" pages per minute of black text
- Individual Intelligence Ink Cartridges
- User Friendly Utilities



NEW!

EPSON

\$399



STYLUS PHOTO 915

- 6-colour ink system
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- True BorderFree



NEW!

\$429



EPL-5900L Laser Printer

- Superior print quality
- Prints at speeds of up to 12 pages per minute
- 1200dpi class resolution
- Incredibly low maintenance - 6000+ pages per cartridge

\$389



MultiFunction CX3100

EPSON

- PRINTER: 5760x720 dpi, 14ppm mono, border free print
- COPIER: 10cpm mono, 8cpm colour
- SCANNER: 600x1200dpi, 48bit pix, scan size 216x297 included (latest version available from downloads)



\$349

DESKJET 3820

- Up to 4800 x 1200 optimised dpi
- Print longer lasting photos
- One-touch print cancel button
- Low-ink indicator light
- Prints up to 12 ppm in black and 10 ppm in colour



\$175



PhotoSmart 7550

- Direct printing from memory card slot
- Borderless 4 x 6 inch photo printing
- Colour LCD control panel
- Up to seven ink printing
- Up to 4800 x 1200 optimized dpi colour printing
- Up to 17 ppm in black and 12 ppm in four colour
- Emergency print mode



\$699



LaserJet 1200

- Up to 15 ppm with 1200 dpi
- Mac-compatible and separate 1284 B parallel and USB ports

Special!



\$749



MultiFunction PSC2210

- Print, scan, fax and copy all in colour
- Up to 4800 optimised dpi in colour or optional 6-ink colour printing
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- Digital camera memory card slots
- Print and copy: up to 17 ppm in black and up to 12 ppm in colour



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PowerShot A200 2.0 MegaPixel

- fixed-focal length, auto focus, 5mm f2.8 lens
- Simple and convenient operation - easy image transfer, photo printing, PC/LCD display.
- Up to 30 seconds movie recording



\$339

PowerShot A30 1.8 MegaPixel

- 3x optical zoom lens, 6x with digital zoom - 35-105 / 35-210mm equivalent.
- Movie recording and playback.



\$429

PowerShot A40 2.0 MegaPixel

- 3x optical zoom, 7.5x with digital zoom - 35-105 / 35-210mm equivalent.
- Movie recording and playback with audio
- 3-Point Advanced Intelligent Auto Focus (IAAF) and single-point AF selection



\$599

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PowerShot Digital IXUS-V3 2.0 MegaPixel

- 1/2.7" CCD image sensor
- Up to 2080x1542 pixel resolution
- 2x optical zoom lens equivalent to 35 - 70mm with a fast f2.8-4.0 aperture and 3.2x digital zoom.
- Up to 3mins movie recording.
- Selectable 9-point IAAF and single center point AF



\$849

PowerShot S45 4 Megapixel



- Ultra-stylish
- CCD image sensor
- Canon 3x a spherical zoom lens
- LCD monitor, TFT Colour

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PowerShot G3 4 Megapixel

- High resolution 1/1.8"
- Big Canon 4x aspherical zoom lens equivalent to 35 - 140mm with a fast f2-3.0 aperture

- Advanced single point FlexiZone AF/AE autofocus
- EOS based shooting modes



\$1529

MOV530

- High resolution Canon 18x zoom lens
- Stylish and compact ultra modern design
- 6mb memory card for high quality still image capture
- Fast USB interface and complete Canon software bundle for still image download
- Fold out and rotatable 2.5" LCD screen ideal for both recording and playback
- Night Mode allowing high quality recordings to be made in very low light levels right down to 0.5 lux



\$1499

DSCP31- 2.0 MP



- Zoom: 3x Precision Digital
- Shutter Speed: 1/30 - 1/1000
- Compression: JPEG/MPEG1
- LCD: 1.6" 61600 pixel
- Maximum Images: 1966 per 128MB Memory Stick

\$449

DSCS85 - 4.1 MP

- Zoom: 6x Precision Digital (3x Optical)
- Minimum Focal Depth: 0.5m (0.04m Macro)
- CCD: 1/1.8" 4,133,000 pixel
- Compression: JPEG/GIF/TIFF/MPEG1
- LCD: 1.8" 123,000 pixels
- Maximum Image: 240 per supplied and 1966 per optional 128MB Memory Stick
- Resolution: 2272x1520

SONY



\$1339

DCR TRV140

- Digital 8 recording
- 1/6" col CCD, USB terminal
- 25X optical/700X digital zoom, IEEE 1394 iFace
- Digital still mem mode



SONY

\$1079

\$12.33 p/w

FinePix S602Z



- 3.1 Million Effective Pixel Super CCD
- 3.3 Million Total Sensor 1/1.7" Super CCD
- 6.0 Million Output Pixels (2832 x 2128)
- 6X Aspherical Zoom Captures Images with Astonishing
- 26.4X Total Zoom
- Digital Movie Mode: QVGA (320x240) Motion JPEG at 30
- Continuous Shooting Mode; 5 Frames / Sec
- Voice Recording Modes with 30 Sec. Picture Annotations
- Built-in Miniature LCD Through-the-Lens Viewfinder and 2" Colour LCD Playback Monitor
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LS443-4.0MP



- image resolution 4.0 megapixel (2448x1832 pixels)
- optical zoom: 3X optical (35mm - 105mm)
- 3.3X Advanced Digital Zoom
- Auto Focus, Sharpness, White Balance

\$1149 NEW!

CX4200-2.0MP



- image resolution 2.0 megapixel (1632x1232 pixels)
- 2X digital zoom
- shutter speed 1/8-1/1000 sec
- built-in lens cover

\$339

PENTAX OPTIO 330GS



- imaging with 3.2 effective megapixels
- high-performance 3X zoom lens
- dimensions of 4.0" x 2.5" x 1.5" and weighs a mere 6.3 oz.
- Stylish compact, full-featured digital

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Pan/Tilt B&W Speed Dome Camera with Audio

This Speed Dome CCD Camera has built in Pan and Tilt motor servo. Use it in conjunction with the @winless plus software to take control of where your camera views.

\$410



Bullet Style Colour Camera with Panasonic CCD Sensor R

This bullet style camera boasts a 1/4" Panasonic CCD sensor and 3.6mm lens housed in a rugged black aluminium case.

\$245



Underwater (1M) Day/Night B&W CCD Camera with Rain/Light Shield

This camera features a water resistance rating to IP57 (the IP57 rating refers to the camera's limited protection against dust ingress)

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CP-400AS Plus

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- ◆ PCI bus Interface
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- ◆ 4 Cameras/Card, 1 Audio Channel
- ◆ NTSC/PAL Video System
- ◆ 16FPS@320*240 of Recording rate and display rate
- ◆ Auto-recovery recording when power comes with normal.
- ◆ Support Win 98, SE, ME, 2000, XP

B&W CCD Camera in Metal Case with Audio



If mounting and setting up one of the PCB based cameras is too daunting, then this self-contained camera is ideal.

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\$185 Colour

Dome Style Colour CCD Camera



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4 Channel Colour Video Processor

This is an intelligent 4 channel processor that will automatically detect the type of cameras in use (PAL or NTSC) and configure itself accordingly. This system provides an analog low cost solution for sites with 4 camera's or less.

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Black & White

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CP-400DX Pro



- ◆ PCI bus Interface
- ◆ Max. 4 Cards on PC
- ◆ 4 Cameras/Card
- ◆ 4 Audio Channel/Card
- ◆ NTSC/PAL Video System
- ◆ Max. 120FPS@320*240 of Recording rate and display rate
- ◆ Auto-recovery recording when power comes with normal.
- ◆ Support Win 2000, XP

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 - ◆ DVD PictureShow SE Imaging Suite
 - ◆ Cool 3D for 3D Graphics (Trial Version)
 - ◆ Photomilap 8 (Trial Version)
 - ◆ MediaStudio PRO 6.5 (Trial Version)

Features:

- ◆ 4x DVD-R, 2x DVD-RW
- ◆ 16x CD-R, 8x CD-RW

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Nec Notebook

Versa M300

P4 1.7, 20GB

14" TFT

Page 8

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- Integrated Intel Extreme Graphics with 266MHz Core
- 40GB Hard Disk Drive
- 48x MAX CD ROM Drive
- 1.44MB Floppy Disk Drive
- Integrated 16bit AC97 Stereo with Internal Speaker
- Integrated Intel PRO/100 Network Controller
- 6 x USB 2.0 ports (2 Front, 4 Rear)
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(F1674)



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\$9,175

(E8120)

J4849A hp procure switch 5348xl Designed to accommodate the most demanding network needs, the new HP Procure Switch 5300xl series delivers the fastest layer 2/3/4 switches for the price of competitor's layer 2 modular switches. The Switch 5348xl series offers scalable, layer 3 wire-speed switching in a compact, 4-slot modular form factor with a 76.8Gbps non-blocking crossbar switching fabric, 24mpps and pre-configured with 48 10/100 ports. The easy-to-use Switch 5300xl series is the latest in technology with unparalleled investment protection and lowest total cost of ownership

hp procure switch 2124, 2512 & 2524

J4868A hp procure switch 2124 Low-cost, unmanaged 24-port switch with 10/100-TX autosensing per port and one open transceiver slot for 100Base-FX uplink. The HP Procure switch 2124 offers HP Auto-MDIX on all 10/100-TX ports and is ideal for low cost unmanaged connectivity.



hp procure switch 2124

Rent* \$12.95/wk (D1512) **\$1,156**

J4812A hp procure switch 2512 The Hewlett-Packard ProCurve 2512 is a high-speed 12-port managed switch with 2 transceiver slots, offering high performance, security, easy management, and some advanced features at an affordable price. The optional transceivers give you the flexibility of adding Gigabit Ethernet or 100-Mbit fibre.



hp procure switch 2512

Rent* \$19.04/wk (A9703) **\$1,699**

J4813A hp procure switch 2524 The Hewlett-Packard ProCurve 2524 is a high-speed 24-port managed switch with 2 transceiver slots, offering high performance, security, easy management, and some advanced features at an affordable price. The optional transceivers give you the flexibility of adding Gigabit Ethernet or 100-Mbit fibre.



hp procure switch 2524

Rent* \$24.60/wk (B0062) **\$2,195**

NEW! HP Storage

C5686A, C5687B hp Surestore dat 40 The HP Surestore DAT40 addresses the evolving backup needs of an exceptionally wide range of organisations and networks. It features a ground-breaking combination of speed and reliability in a cost-effective 40GB backup for servers and workstations



C5686A

Internal Rent* \$23.48/wk

(83310) **\$2,095**

C7400A, C7401B hp Surestore Ultrium 230 This ultra-fast LTO drive stores 100GB (native capacity) of data on a single tape. With a transfer rate of up to 108GB/hr the HP Surestore Ultrium 230 delivers the best performance even when the server can't match the drive's speed, by adjusting the tape speed to optimise data streaming. The Ultrium 230 now comes with HP One-Button Disaster Recovery (OBDR) software.



C7400A

Internal Rent* \$78.17/wk

(C4269) **\$9,323**

C7401B

External Rent* \$83.63/wk

(G2480) **\$9,974**

hp StorageWorks SDLT 160/320 GB Tape Drive Offering 160GB native capacity, and 16MB/s transfer rate, businesses can lower total costs of ownership by reducing the number of data cartridges required and by shrinking the backup window for business-critical data. In addition, backward-read compatibility to existing DLT and SDLT-based solutions provides the highest level of investment protection while offering a smooth transition path to new SDLT 160/320-based data protection solutions.



Internal Rent* \$82.37/wk

(G2730) **\$9,824**

External Rent* \$90.35/wk

(G2481) **\$10,775**

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
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*Delivery charges extra.

**hp procure switch 408**

Unmanaged 8 port 10/100 switch in a compact sized package. This switch offers half/full duplex, 10/100 autosensing on every port. Lifetime Warranty: with Next Day Exchange

(C9017)

\$385Web
Direct

See Web Direct Link (at top of page) for more products and latest info!

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Compaq Services Carepaq Upgrades:
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Microsoft Operating System Application Telephone Support Pack-10 (D6479)

\$1,699

Pack-25 (D6480)

\$4,285

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HARRIS TECHNOLOGY™

hp server tc2110 Series

hp server tc 2110 P4 2.0GHz 40GB IDE

- Intel® Pentium 4 2.0GHz 400MHz FSB
- 128MB ECC SDRAM (1.5GB max)
- 48x CD-ROM
- 40GB IDE HDD
- FDD, Dual-channel Ultra3/66/100 IDE controller
- 3 PCI slots
- 10/100TX LAN
- 3 Years Limited Warranty

Rent* \$20.12/wk (F9323)

P5530A **\$1,795**

hp server tc 2110 P4 2.0GHz 18GB SCSI

- Intel® Pentium 4 2.0GHz 400MHz FSB
- 128MB ECC SDRAM (1.5GB max)
- 48x CD-ROM
- 18GB Ultra3 SCSI HDD
- FDD, single-channel Ultra 3 SCSI controller
- 10/100TX LAN, 6 shelves
- 2 full-length PCI slots
- startup CD & toptools for servers
- 3 Years Limited Warranty

Rent* \$23.48/wk (F9321)

P5529A **\$2,095**

Windows® 2000 Server Bundle

hp server tc 2110 P4 2.0GHz 18GB SCSI with Windows 2000 Server preloaded, 5 CAL

- Intel® Pentium 4 2.0GHz 400MHz FSB
- 256MB ECC SDRAM (1.5GB max)
- 48x CD-ROM
- 18GB Ultra3 SCSI HDD
- FDD, single-channel Ultra 3 SCSI controller
- 10/100TX LAN, 6 shelves
- 2 full-length PCI slots
- startup CD & toptools for servers
- 3 Years Limited Warranty

Rent* \$34.68/wk (G4369)

P7740A **\$3,495**



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Compaq ProLiant ML310

Branch office solution

For growing businesses running sophisticated small applications and branch offices of larger organisations that need a platform for single-function solutions. Choosing a ProLiant server is making an investment in your company's future.

- Intel® Pentium 4 2.0GHz or 2.2GHz processor
- 4GB DDR RAM maximum memory capacity
- Single-channel Ultra3 SCSI or dual channel ATA100 with integrated ATA RAID
- Standard 40GB ATA HDD or 18GB SCSI HDD
- 1 year warranty with optional upgrade to 3 years

ML310 P4 2.0GHz 40GB ATA Rent* \$24.76/wk (G2487) **\$2,495**

ML310 P4 2.0GHz 18GB SCSI Rent* \$29.72/wk (G2486) **\$2,995**

ML310 P4 2.2GHz 40GB ATA Rent* \$26.74/wk (G2489) **\$2,695**

ML310 P4 2.2GHz 18GB SCSI Rent* \$30.71/wk (G2488) **\$3,095**



Compaq ProLiant ML350 G3

Headroom for corporate workgroups and growing businesses!

The affordable 2-way performance of the ML350 G3 delivers the perfect balance of price, performance and availability increasing workgroup productivity without breaking your budget.

- Intel® Xeon 2.0GHz or 2.2GHz processors
- ServerWorks grand champions LE chipset
- PC2100 Advance ECC DDR SDRAM: 256MB standard on base models, 8GB max, interleaving capable
- Five expansion slots, four 64bit 100MHz PCI-X and one 32bit 33MHz PCI
- Tool-free quick deploy rails on rack models

ML350 G3 2.0GHz Tower Model Rent* \$38.74/wk (G2741) **\$4,095**

ML350 G3 2.0GHz Rack Model Rent* \$41.58/wk (G2743) **\$4,395**

ML350 G3 2.2GHz Tower Model Rent* \$40.63/wk (G2744) **\$4,295**

ML350 G3 2.2GHz Rack Model Rent* \$46.31/wk (G2745) **\$4,895**

- 3 year on-site warranty



Compaq ProLiant ML370 G3

Integrated Virtual Presence and tool-free serviceability ideal for corporate environments

Integrated Virtual Presence and tool-free serviceability ideal for corporate environments!

The most versatile 2-way expansion server with industry leading management and serviceability for corporate data centers and remote sites.

- Up to two Intel® Xeon 2.8GHz Processors
- Up to 512MB DDR ECC RAM Standard (12GB Max)
- 6 open PCI-X 64bit/100 Mhz slots
- Up to 8 hot plug hard drive bays
- 3 year on-site warranty

ML370 G3 P2.8GHz Tower Model Rent* \$57.67/wk (G8946) **\$6,250**

ML370 G3 P2.8GHz Rack Model Rent* \$61.41/wk (G8943) **\$6,900**



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Iplex - First with Pentium® 4 3GHz



The Iplex T400 is ideal for the small business user looking for a system with Pentium® 4 technology that has superior performance and expansion capabilities!



Internet keyboard
optional upgrade.

Iplex recommends Microsoft® Windows® XP.

IPEX INTEL® PENTIUM® 4 SYSTEMS

Form Factor	Altair T400 Tower	Altair T400 Tower	Altair T400 Tower
Processor	Intel® Pentium® 4 2.0GHz	Intel® Pentium® 4 2.4GHz	Intel® Pentium® 4 3GHz
RAM	256MB DDR	512MB DDR	512MB DDR
HDD	80GB @ 7200RPM	80GB @ 7200RPM	80GB @ 7200RPM
Multimedia	CD/RW, DVD	CD/RW, DVD	CD/RW, DVD
Graphics	Onboard	GF4 MX440 64MB	GF4 MX440 64MB
Sound	Onboard	Onboard	Onboard
LAN	Onboard	Onboard	Onboard
Modem	Internal 56K	Internal 56K	Internal 56K
Peripherals	Optical Mouse	Opt Mouse, Wireless K/B	Opt Mouse, Wireless K/B
Warranty	1 Year RTB	1 Year RTB	1 Year RTB
Microsoft® OS	MS Windows® XP Home	MS Windows® XP Home	MS Windows® XP Home
Microsoft® Software	MS Works 7.0	MS Works 7.0	MS Works 7.0
Monitor	17" CRT Screen	17" CRT Screen	17" CRT Screen
Rent*	\$22.40/wk	\$24.31/wk	\$34.72/wk
Part #	(G4644)	(G0235)	(G5825)
	\$1,999	\$2,450	\$3,499
Monitor	15" TFT LCD Screen	15" TFT LCD Screen	
Rent*	\$23.81/wk	\$28.28/wk	
Part #	(G4645)	(G0328)	
	\$2,399	\$2,850	

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--	--	--

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IPEX LCD FLAT SCREEN MONITORS

IPEX 15" LCD

- Refresh Rates: Horizontal: 24 - 60Hz, Vertical: 56 - 85Hz
- Resolution: 1024 x 768 @ 75Hz
- Viewable display area: 307mm H x 230mm V
- Multimedia with tilt & swivel base.

Rent* \$8.95/wk (C9400)

\$799

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IPEX 17" LCD

- Refresh Rates: Horizontal: 24 - 80Hz, Vertical: 56 - 85Hz
- Resolution: 1024 x 768 @ 75Hz, 1280 x 1024 @ 60Hz • Viewable display area: 337mm H x 270mm V.

Rent* \$14.11/wk (C9401)

\$1,259

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Superior Quality and Performance

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consulting & advice
available on all items.

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computer
needs!

RENTSMART
The figures
quoted are based
on a per week
basis over 3
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NEC Versa M300

Ideal for both SME and corporate power users the Versa M300 offers outstanding power and flexibility. Choose between the valuable Mobile Celeron or an impressive Pentium 4-M processor. An all in one design, with the FDD and optical drive on board for easy access and mobility, and a range of I/O ports that give you the connectivity you need while on the move.

**ON-BOARD
FDD**



Processor	Celeron® 1.5GHz Mobile	P4 1.7GHz Mobile	P4 1.9GHz Mobile
Display	14.1" TFT XGA	14.1" TFT XGA	15.1" TFT XGA
RAM	128MB DDR	256MB DDR	256MB DDR
HDD	20GB	20GB	30GB
Optical Drive	CD ROM	DVD	COMBO-DVD/CDRW
FDD	Inbuilt	Inbuilt	Inbuilt
Video RAM	32MB ATI Radeon IGP 340M - 4x AGP	32MB ATI Radeon IGP 340M - 4x AGP	32MB ATI Radeon IGP 340M - 4x AGP
Touch Pad	Yes	Yes	Yes
Size	329x265x36.5-38mm	329x265x36.5-38mm	329x265x36.5-38mm
Weight	2.77kg	2.77kg	2.97kg
OS	Windows® XP Pro	Windows® XP Pro	Windows® XP Pro
I/O Ports	Serial, Firewire, 3 x USB, S-Video TV out, for all models		
Rent*	\$25.79/wk	\$29.72/wk	\$37.79/wk
Part#	(G4790)	(G2187)	(G4789)
	\$2,599	\$2,995	\$3,995

**TOUCH
PAD**

Ultra Portable Executive Notebooks

NEC Versa E120

- Intel® Pentium® III 933 MHz Mobile
- 256MB RAM
- 12.1" TFT XGA LCD
- 30GB HDD
- Optical Drive - CDRW External
- 16MB Video RAM
- Microsoft® Windows® XP Professional
- External USB Floppy Disk Drive
- **Weights only 1.39kg**
- **1.9cm thin!**



Rent* \$37.79/wk (G6638)

\$3,995

NEC Versa S260

- Intel® Pentium® III 1.13GHz Mobile
- 256MB RAM
- 12.1" XGA TFT LCD
- 30GB HDD
- Combo Drive - DVD/CDRW on board
- 8MB ATI Radeon Mobility AGP Chipset
- Microsoft® Windows® XP Professional
- External USB Floppy Disk Drive
- **Weights only 1.89kg with weight saver**
- **3.43cm thin!**



Rent* \$37.79/wk (F9904)

\$3,995

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New NEC Servers

NEC Express 5800 Server 110Ef

- Pentium 4 2.0GHz/512KB x 1
- 128MB of PC133 SDRAM (Un-Buffered). Maximum 1.5GB
- Up to 3 non hot-swap HDD bays
- Standard IDE or optional SCSI Max.219.6GB (73.2GB x3) IDE RAID (0/1/5) can be configured with optional IDE disk array controller

Rent* \$23.61/wk (G4483)

\$2,379



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NEC Express 5800 Server 120Me

- Pentium III Xeon 1.8GHz x 1 or 2 CPU
- 256MB of PC133 SDRAM. Maximum 4GB
- HDD bays x10, max. 732GB (73.2GB x10) hot swap drives
- Support redundant power supply

Rent* \$75.29/wk (G4485)

\$8,459



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- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base of Warranty Extension to On-Site

NEC Server Promotions

Purchase any 2 processor capable Servers and receive Microsoft Windows 2000 Server (5 CAL) as a bonus. or purchase any 4 way, 8 way or Blade Server products and receive Microsoft Windows 2000 Advanced Server (25 CAL) as a bonus. (promo software bundled with servers)

Terms and conditions apply. Offer ends 28/2/03.

NEC Small Business Bundles

NEC Express 5800 File Server 110Ef

- Pentium 4 2.0GHz CPU
- 256MB RAM
- 60GB IDE HDD
- 3 year on-site warranty
- Microsoft Windows 2000 Server with 5 CAL

5x NEC V730 MultiSync Monitor

- 17" Colour CRT Monitor
- 1280 X 1024 @66Hz maximum
- 3 year RTB warranty

5x NEC Powermate ML4 PC

- Pentium 4 CPU 2.0GHz
- 256MB RAM
- 40GB HDD
- CD ROM
- 10/100NIC
- Microsoft Windows XP Pro
- Internet Explorer 6.0
- Outlook Express 6.0
- Star Office
- 1 year RTB warranty

Server
110Ef
1x

PC
ML4
5x

Monitor
V730
5x



\$12,990

Rent* \$105.30/wk (G8730)

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Kwiktron's vast inventory of the latest equipment is in-stock and ready for immediate delivery.

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Satellite *The ultimate statement in mobile computing*

The award-winning series of Satellite notebook PC's offer the ideal balance in affordability and performance. Every Satellite is built with the right mix of features to help you power through your day-to-day computing requirements.

Accessories

Universal AC Adapter (D1556)
\$89

Dobby Oxford Carry Case (C5388)
\$82

Targus USB Mobile Replicator (B4533)
\$175

Satellite	1110	1410	2410
PROCESSOR	Cel 1.6GHz	Cel 1.8GHz	P4 1.8GHz-M
RAM STD	NEW 128MB	NEW 256MB	NEW 256MB
HARD DRIVE	20GB	20GB	30GB
SCREEN	14.1" XGA TFT	15" XGA TFT	15" XGA TFT
MAX RESOLUTION	1024 x 768	1024 x 768	1024 x 768
POINTING DEVICE	Touch Pad	Touch Pad	Touch Pad
CD-ROM/DVD	DVD	DVD	DVD
IEEE 1394 Firewire/SD	no	no	yes
VIDEO RAM	16MB	16MB	16MB
56K v.90 & 10/100 LAN	yes	yes	yes
WIRELESS LAN	Antenna Ready	Antenna Ready	Antenna Ready
WARRANTY	1 year	1 year	1 year
OP SYSTEM	Windows* XP Pro	Windows* XP Pro	Windows* XP Pro
Rent*	\$Call/wk	\$Call/wk	\$Call/wk
PART NUMBER	(G8797)	(G8795)	(G8796)
	\$Call	\$Call	\$Call



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S30/T50 Projectors

With a sleek compact design and lightweight at only 2.2 kilograms, the Toshiba T50 and S30 data projectors are the ideal companion for mobile users who demand quality images and portability at a low price.

Ultra portable • Light and compact at only 2.2 kilograms making it easy to carry from one presentation to the next.

The power of LCD • A dazzling 1,400 ANSI lumens ensures outstanding output from data or video and a crisp, clear image even in daytime.

Ultra quiet 35dB • Quiet operating design employing an efficient heat-reducing fan with a mechanism that reduces noise • Power save mode enables extended lamp life.

Speedy set up • 'Plug and project' functionality ensures that even a novice will have the projector up and running in seconds • Automatic keystone correction guarantees a perfect picture at up to a 15 degree angle • Can be mounted for permanent installation.



2 year warranty & 3 month hot swap warranty

Pocket PC

Accessories

USB Cable Connection • AC Adapter with Cable • Replacement Stylus 3Pack • Coloured Slide Panel Set (4) (ES70 only)

Projectors	S30	T50
ANSI	1400	1400
WEIGHT	2.2Kg	2.2Kg
RESOLUTION	SVGA	XGA
Rent*	\$35.72/wk	\$48.90/wk
PART NUMBER	(G8800)	(G6688)
	\$3,599	\$5,299

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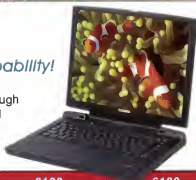
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Satellite Pro and Pocket PC

Satellite Pro®

Exceptional performance with wireless capability!

The Satellite Pro® series give you the best of both worlds — power and portability. Built with just the right mix of features to let you power through day-to-day computing tasks with ease. Colourful displays and powerful processors provide plenty of CPU horsepower to even the most demanding applications, while the integrated multimedia devices never leave functionality behind.



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Satellite Pro	TE-2100	TE-2100	6100	6100
PROCESSOR	P4 1.8GHz	P4 2.0GHz	P4 1.8GHz	P4 2.0GHz
RAM STD	256MB	256MB	256MB	256MB
HARD DRIVE	40GB	40GB	40GB	60GB
SCREEN	14.1" TFT	14.1" TFT	15" TFT	15" TFT
MAX RESOLUTION	XGA	XGA	XGA	UXGA(1600x1200)
CD-ROM/DVD	DVD	DVD/CD-RW	DVD/CD-RW	DVD/CD-RW
VIDEO RAM	16MB	16MB	32MB	32MB
56K v.90 & 10/100 LAN	yes	yes	yes	yes
WIRELESS LAN	Antenna	Antenna	Antenna	Antenna + mini PCI
WARRANTY	1 year	1 year	1 year	1 year
Rent*	\$Call/wk (G8798)	\$Call/wk (G8799)	\$37.79/wk (G4208)	\$46.09/wk (G4209)
WINDOWS® 2000/ XP PRO	\$Call	\$Call	\$3,995	\$4,995

Portégé Series



Rent* \$Call/wk
(G4205) **\$Call**

2010



Rent* \$45.40/wk
(G4204) **\$4,799**

3500



Rent* \$43.47/wk
(E3499) **\$4,595**

4010

POCKET PC E330

Intel Strongarm Xscale 300Mhz processor • Microsoft Pocket PC 2002 operating system • 64MB of RAM & 32MB ROM • Ultra light weight at only 147 grams • Ultra slim size: H125mm x W79mm x D12.4mm • Extra bright 3.5" TFT screen • Long 10 hour battery life • 72 hour data back up, when main battery is flat • In built speakers & stereo headphone socket • SD card slot for additional memory or Bluetooth SD card • Infra-red port • Internal jog/scroll ball • Microphone & record button



Rent* \$10.07/wk (G2443) **\$899**

POCKET PC E740

Toshiba Pocket PC e740
400Mhz 64MB SD/CF Slots
Bluetooth

Rent* \$14.56/wk (F4046)

\$1,299

Toshiba Pocket PC e740
400Mhz 64MB SD/CF
Slots w/WiFi

Rent* \$15.12 /wk (F4047)

\$1,349



2GB PC Card HDD



Easily store and share information in a small and ultra portable device that is simple to use and easy to carry anywhere. (D3427) **\$495**

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PALM ACCESSORIES

PALM ZIRE CARRY CASE (G4521)
\$39

PALM M100 CARRY CASE (G6106)
\$64

PALM TUNGSTEN T SLIM LEATHER CASE (G6762)
\$59

PALM M500 SERIES LEATHER CASE (C5072)
\$67

PALM 32MB SD CARD (F0359)
\$127

PALM SERIAL HOT SYNC CABLE M130/500/TUNGSTEN (G3645)
\$25

PALM™ TUNGSTEN™ T



- Slide out Graffiti® writing area with 5-way navigation button.
- Crisp, clear colour, 320x320 reflective TFT colour display supports more than 65,000 colours.
- Powerful OMAP™ 1510 processor from Texas Instruments.
- Voice recording.
- Built-in Bluetooth – Communicate wirelessly with devices nearby, such as your mobile phone, notebook, printer and other Palm™ handhelds.

TUNGSTEN™ T

Included software lets you view, edit and create Word, Excel, PowerPoint and Acrobat files.

- Dual expansion – use MultiMediaCard and SD expansion cards. Or, use the Palm™ Universal Connector to add optional peripherals such as a portable keyboard.

Rent* \$12.30/wk (G4334) **\$1,098**



PALM™ ZIRE

- An affordable way to organise your life.
- It's smaller and lighter yet stores thousands of names, numbers, appointments and memos.
- Keep events, appointments, names and phone numbers.
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- Set alarms and reminders.
- Customise by adding software or accessories.

Zire™

Get Organised
For Less!

(G2883) **\$236**

PALM™ M515



- Address book, date book, clock, to do list, memo pad, note pad and calculator on 16-bit colour display.
- Includes 16MB memory, infrared transfer, USB Hotsync cradle with battery charger.
- Desktop software, Documents to Go v3.0, MGI PhotoSuite, AvantGo, Pocket Mirror v3.0.

- Reader and Multimedia software, vibrating and LED alarms.
- Compatible PC running Windows 98/2000/Me or Mac Power PC running OS 8.5.1 up to OS 9.

Rent* \$7.38/wk (E6783) **\$659**



PALM™ M130

- Slim shape, a vibrant colour display, fun, colourful faceplates sold separately.
- Palm OS® Version 4.1 Operating System.
- Universal connector allows you to add peripherals such as a modem, a keyboard, a GPS receiver, and more.
- 8MB of memory.
- Expansion card slot allows you to add additional storage and back up your data, add applications, and content.

• Infrared Port. (E4391) **\$465**



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Web Direct
www.ht.com.au/cat/sony

Micro Vault Now Compatible with USB2.0

WIO Entertain the Possibilities

16.1" UXGA!

Model	PCGFXA10	PCGGRZ10	PCGGRX5P
Screen	14.1" XGA	15" XGA	16.1" UXGA
Processor	Athlon 1400+	P4 2.40GHz	P4 2.0GHz-M
RAM	256MB	256MB	512MB
Hard Drive	30GB	30GB	60GB
Video Memory	8MB	16MB	32MB
CDRW/DVD Combo Drive	Yes	Yes	Yes
Memory Stick Slot	No	Yes	Yes
i.LINK / Firewire	Yes	Yes	Yes
Modem & Network	Yes	Yes	Yes
	Rent* \$28.77/wk (G2280)	Rent* \$37.83/wk (G4130)	Rent* \$46.13/wk (G4616)
	\$2,899	\$3,999	\$4,999



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*Delivery charges extra.



CLiÉ



PEGN70VG

 Rent* \$15.12/wk
(G3864)

\$1,349


- Palm OS 5.0
- Intel PXA250 200MHz
- Built-in Camera
- Integrated Keyboard
- 320 x 480 Colour Display
- Voice Record Function
- Wireless LAN Expansion Slot
- Memory Stick Slot
- ATRAC3/MP3 Audio Playback
- Jog dial with back button
- Earphones supplied

CLiÉ



MP3



- Dragonball Super VZ 66MHz
- Earphones supplied
- 16MB Memory
- 320 x 320 Colour Display
- Memory Stick Slot
- Jog dial with back button
- ATRAC3/MP3 Audio Player

 Rent* \$9.51/wk
(F5201)

\$849

CD-R/RW Drives

Internal 48x CD Recorder, 48x ReWriter, 48x CD Player


 CRX20A1
(G1069)

\$165

Internal 52x CD Recorder, 24x ReWriter, 52x CD Player


 CRX220A1
(G8501)

\$199

Digital Still Cameras

DSCP31

- 2.0 Mega Pixel with 8MB Memory Stick
- 3x Precision Digital Zoom
- 1.6" LCD Screen
- Optical Viewfinder
- Clip Motion
- Video Out

(F1093)

\$499

DSCP51

- 2.0 Mega Pixel with 16MB Memory Stick
- 2x Optical, 6x Precision Digital Zoom
- 1.6" LCD Screen
- Intelligent Flash with Red Eye Reduction
- Light Metering
- MPEG Movie HQX

 Rent* \$7.05/wk
(F1233)

\$629

DSCP71

- 3.2 Mega Pixel with 16MB Memory Stick
- 3x Optical, 6x Precision Digital Zoom
- Macro Focus
- ISO Sensitivity Setting
- AF Illuminator
- MPEG Movie HQX
- USB Interface

 Rent* \$9.51/wk
(E7751)

\$849

Cyber-shot



MICRO VAULT

USB Storage Device

The perfect medium for carrying Powerpoint presentations, PDFs, MPEG files and large databases. Convenient USB2.0 connection allows even faster access to your files, while being compatible with existing USB1.1 technology. There are no cables or adaptors required.



Micro Vault - Now compatible with USB2.0 High Speed Connection

- USB 2.0 High Speed transfer
- Compatible with USB1.1
- Plug 'n' Play
- Password Lock Software

USM32U2
32MB RAM
(G8386)
\$95
USM64U2
64MB RAM
(G8388)
\$135
USM128
128MB RAM
(G8390)
\$215
USM256
256MB RAM
(G8394)
\$375

Portable PC Combo Drive MS Reader, Audio Player, 24x CD Record, 8x CD ReWriter, 8x DVD Player.


 MPDAP20U
Rent* \$8.95/wk
(G6141)

\$799

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 Sales: 1300 13 9999
Fax: 1300 13 6666

 Web: www.ht.com.au
Email: sales@ht.com.au


See Page 2 for Locations

JAN FEB 13

Power Back Up = Power Protection

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Delivery charges extra.

APC



PNote Pro
(99592)

\$45



Surge
Arrest 5 Strip
(A0098)

\$55



APC
Symmetra
Power Array
8kVA, exp. to
16kVA
(71087)

Rent*\$113.44/wk

\$13,995

So good we
use it
ourselves!

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The figures
quoted are based
on a per week
basis over 3
years. T.A.P.
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TECHNOLOGY**

APC Back-UPS ES 350/500



Affordable battery backup

The new APC Back-UPS ES 350/500 is designed as an affordable battery backup to provide continued uptime and hardware protection for home and home office computer users. This product has five Australian style outlets (three battery and surge, two surge only outlets), new attractive flat design phone, modem, fax and DSL data line surge protection, computer interface port for USB communications and ships with file saving and auto-shutdown software. Comes with 2 years product warranty.

Back-UPS ES 350va (E1093)

\$185

Back-UPS ES 500va (E0709)

\$235

APC Back-UPS Pro® for Workstations



Smart battery backup & high performance surge suppression for Windows 95 & NT PCs

PowerChute® Plus software lets your UPS shut down your applications gracefully in the event of an extended power failure. Includes additional outlet for protection of printers, audible alarms, phone/modem protection, user replaceable hot swappable batteries.

APC Back-UPS Pro 280si (76636)

\$257

APC Back-UPS Pro 420si (76637)

\$419

APC Back-UPS Pro 650si (76638)

\$485

APC Smart-UPS with USB Support



Smart-UPS 1000VA, 1500VA

Smart-UPS protects your data by supplying network-grade battery backup when power fails. With PowerChute® Plus software the uninterruptible power supply (UPS) will safely store data and shut down your network operating system before the battery is fully discharged, whether you're there or not. SmartSlot internal accessory slot allows you to install optional accessories to enhance the performance of your UPS. APC Smart-UPS is the perfect UPS for file servers, minicomputers, UNIX CPU's, Internet hubs, telecommunications systems and other mission-critical applications.

APC Smart-UPS 1000VArnt* \$11.04/wk (D9337)

\$985

APC Smart-UPS 1500VArnt* \$14.53/wk (D4218)

\$1,297

APC NetShelter VX Black 42U Premium Equipment Enclosure



Next generation, high quality enclosure solutions designed to meet the needs of today's and tomorrow's networking environment.

Features:

Adjustable mounting depth, casters, cold rolled steel, computer grade ventilation, levelling feet, lockable doors and side panels, powder coat, removable doors and side panels, rolls through 7 ft door, roof and base cable access, ships fully assembled, equipment mounting hardware, keys, user manual.

Rent* \$31.01/wk (E4994)

\$3,125



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Belkin - KVM Switches & Networking Solutions

Over One Million Belkin KVM units sold Worldwide!



CONNECT MULTIPLE COMPUTERS USING BELKIN KVM SWITCHES



F1DB102P Economy 2 Port KVM Switch - PS/2 (D3162) **\$92**

F1DB104P Economy 4 Port KVM Switch - PS/2 (D3159) **\$175**



Don't forget to include your Belkin All-In-One cables

The easiest & neatest way to connect all your computers and servers to your PS/2 & USB KVM switches, providing image clarity for high-resolution applications.

Belkin Networking Solutions

WIRED ETHERNET NETWORK

F5D5000 Desktop Network PCI Card (C5581) **\$25**

F5D5130z 5 Port Network Switch 10/100 (D4192) **\$129**

F5D5230z 4 Port Cable/DSL Gateway Router (D5943) **\$249**

F5D5020 Notebook or CardBus Network Card 10/100Mbps PCMCIA NIC - 16 Bit (C5583) **\$89**

F5D5010 Notebook or CardBus Network Card 10/100Mbps CardBus NIC - 32 Bit (C5582) **\$99**

WIRELESS NETWORK

F5D6050z USB Wireless Adapter (D8216) **\$189**

F5D6130z Wireless Network Access Point (D8217) **\$399**

F5D6230z Wireless Router (3 Port) (D8219) **\$579**

F5D6020z Wireless Notebook Network-Wireless PCMCIA (D8213) **\$175**

F5D6001z Wireless Desktop Network Card PCI Adapter (G1691) **\$235**

F5D6060au Wireless CF Network Card (F0910) **\$235**

Belkin Surge Protectors

Belkin offers a complete Surge Protection range, for the average home to a total office solution. All Belkin Surge Protectors are guaranteed to protect against over-voltages, catastrophic surges and lightning strikes. We also offer the best no hassles connected equipment warranty in the business. We will repair or replace any damaged connected equipment.

Belkin's Home Office Grade Connected Equipment Warranty up to \$25,000

Protect your computer, cordless phone, bubblejet printer, copier or fax.

Purchase the Belkin BSCAU007 and receive a free single outlet surge cube F5C195z worth \$25 (while stocks last).



B5CAU007 (F4128) **\$49**

Superior Grade Surge Protectors Connected Equipment Warranty up to \$50,000

Ideal solution for protecting computers, workstations, office copiers, faxes and other electronic equipment.



F5C206z2-TEL3 (C4604) **\$98**

Belkin's Maximum Grade Surge Protectors Connected Equipment Warranty up to \$80,000

Ideal solution for protecting servers, multi-media set-ups and critical office equipment.



F5C208z2-TEL3 (C4607) **\$119**

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*Delivery charges extra

Belkin PDA

F8E717

LCD Screen Overlays - Compaq IPAQ

(E0216) **\$24**

F8Q1503

SnapNTYPE keyboard for IPAQ 3800 (F3219) **\$89**

F8Q1000

USB Sync Charger (D5952) **\$42** for IPAQ H3700 Series & below.

F8Q1401

Leather Flip Case - IPAQ

(E1520) **\$45**

F8Q1402

Slim Leather Case - IPAQ

(E1521) **\$42**



Networking Solutions

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Delivery charges apply.

Antennae

DWL-R60AT
Indoor 6DBI
Gain Patch
(G2082)
\$56

ANT24-
08018.5dBi
Pico Cell Patch
Antenna
(F4220)
\$249

Filters

DSL-10MF
ADSL
In-line filter
(E6973)
\$19

DSL-10CF
ADSL
In-Line
Splitter/
Filter
(E6971)
\$32

DSL-10SP
ADSL
Hard-Wired
Splitter/
Filter
(E6970)
\$34

Wireless Internet Access/Networking @22Mbps

DI-614+
AirPlus™ 22 Mbps Wireless DSL/Cable Router with 4 Port Switch



New 22Mbps Wireless

Built-In Bigpond Cable Login

(G0229) **\$395**

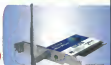
DWL-650+
AirPlus™ 22 Mbps Wireless LAN PCMCIA Card

(F5422) **\$149**



DWL-520+
AirPlus™ 22 Mbps Wireless LAN PCI Adapter

(F5421) **\$179**



DWL-900AP+
AirPlus™ 22 Mbps Wireless LAN Access Point



New 22Mbps Wireless

(F5423) **\$309**

Dualband Wireless Solutions 11/22/54 Mbps

DWL-6000AP
AirPro™ 11 / 22 / 54 Mbps (2.4GHz / 5GHz) Dualband Wireless LAN Access Point



Rent* \$8.05/wk (G3809) **\$719**

DWL-AB650
AirPro™ 11 / 54 Mbps (2.4 / 5GHz) Dualband Wireless LAN PCMCIA Card



(G3813) **\$295**

DWL-AB520
AirPro™ 11 / 54 Mbps (2.4 / 5GHz) Dualband Wireless LAN PCI Adapter



(G3814) **\$329**

Hi-Speed Internet Access

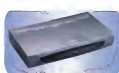
DSL-604+ IP Router with Built-in ADSL Modem, 22Mbps AirPlus Wireless Access Point and 4 Port 10/100Mbps Switch

Rent* \$7.27/wk (G8729)

\$649



DSL-504 ADSL Router with Built-in Modem & 4 Port 10/100 Mbps Switch



(C7593)

\$429

Best Selling

DSL-300+ Ethernet ADSL Modem



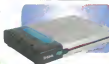
(G2081) **\$345**

DSL-500 ADSL Router with Built-in Modem



(D0801) **\$369**

DI-704P IP Router for DSL/Cable Modems with 4 Port Switch & Single Port Print Server



(E5861) **\$215**

Built-In Bigpond Cable Login

DI-713P DSL/Cable Wireless Router - 3x 10/100 and Print server

(C7596) **\$385**

DFL-500
Secure Firewall & VPN - 20 VPN Tunnels, DMZ, SPI, IPSec Security DES & 3 DES, Content Filtering & Virus Scanning, VPN Protocol, PPTP & L2TP

Rent* \$11.93/wk (F0900) **\$1,065**



DI-804V
VPN Router for Cable/DSL - 8 VPN tunnels, DMZ, SPI, VPN Protocol PPTP & L2TP and IPSec Security



(F4303) **\$359**

Firewall

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Networking Solutions

Switch Solutions For Every Application

Extensive Choices

D-Link offers an extensive range of switches for fast ethernet and gigabit ethernet. Unmanaged and managed solutions are available, with a variety of sizes for homes, small offices, workgroups, departments and enterprises. Port densities range from as few as 5 to as many as 128 ports per switch. Layer 2 switches without router capability and layer 3 switches with router capabilities are all available.

1000 Mbps Gigabit Solutions

DGS-1004T 4 Port Gigabit Copper Ethernet Switch
Rent* \$6.93/wk (G3818) **\$619**

DGS-1008T 8 Port Gigabit Copper Ethernet Switch
Rent* \$11.75/wk (D9338) **\$1,049**



DGS-1016T 16 Port Gigabit Copper Ethernet Switch
Rent* \$25.75/wk (G3825) **\$2,595**

DGS-1024T 24 Port Gigabit Copper Ethernet Switch with 2 Mini GBIC expansion slots
Rent* \$36.07/wk (G1968) **\$3,635**

Managed/Stackable Solutions

DES-3226S 24 Port 10/100Mbps Managed Switch, Stackable (see modules**)
Rent* \$16.57/wk (F9634) **\$1,479**

DES-3326S 24 Port 10/100Mbps Managed Layer 3 Switch, Stackable (see modules**)
Rent* \$35.68/wk (G3828) **\$3,595**



10/100 SOHO Solutions

DES-1005D 5 Port 10/100Mbps Fast Ethernet Unmanaged Switch (85101) **\$96**

DES-1008D 8 Port 10/100Mbps Fast Ethernet Unmanaged Switch (98254) **\$138**



10/100 Desktop Solutions

DES-1016D 16 Port 10/100Mbps Fast Ethernet Unmanaged Switch (F0915) **\$315**

DES-1024D 24 Port 10/100Mbps Fast Ethernet Unmanaged Switch (G1783) **\$417**



10/100 Rackmount Solutions

DES-1024R+ 24 Port 10/100Mbps Unmanaged Switch with 100Mbps Fibre expansion slots (for DES-102F)
Rent* \$7.27/wk (E3669) **\$649**

DES-1226R 24 Port 10/100Mbps Unmanaged Switch with Optional Fibre/Gigabit Module (see modules**)
Rent* \$14.33/wk (G3817) **\$1,279**



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Switch Modules

1 Port
100Base FX
DGS-332GS
(F9636) **\$159**

** 2 port
100Base FX
DES-131F
(G3829) **\$305**

**2 port
1000 BaseT
DES-132F
(G3830) **\$385**

**2 port
1000Base
SX DES-132T
(G3831) **\$543**

**DES-132G
(G3832)
Rent* \$10.25/wk **\$915**

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Email: sales@ht.com.au

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USB & FireWire Solutions

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USB Video Capture Adapter



UV-100
USB to
Analogue
Video Adapter
(G1943)
\$149

USB to PS/2



UKMC-100
USB to PS/2
Keyboard &
Mouse
Adapter
(B0557)
\$47

USB to Serial Converter



UMC-100
USB to 9 Pin
RS232 Serial
Converter
(80782)
\$69

USB 2.0 & FireWire Hubs

Connect your USB 2.0 and FireWire peripherals to your PC with our range of high speed hubs. USB 2.0 hubs are backward compatible with USB 1.1 products.



UH-402 4 Port USB 2.0 UFO Hub (G1938) **\$88**
UH-422 4 Port USB 2.0 Pocket Hub (G8675) **\$88**
1394-601 6 Port FireWire Repeater (D8947) **\$129**
UHF-432 Combo Hub - 4 x USB2.0 Ports & 3 x FireWire Ports (G5589) **\$169**

USB 2.0 Ext HDD Enclosure

Just drop in any IDE 2.5" hard drive and you have a hot-swappable, platform-independent, high-speed portable drive!

- Use for External Storage
- Ideal for Backup Device
- Pocket Size for Portability



UHD-2500 (G8727) **\$89**

USB Flash Storage Drives



- Pocket Size
- True Plug and Play
- Security Zone Feature

UFD-0016 USB Flash Drive - 16MB (G8720) **\$57**
UFD-0032 USB Flash Drive - 32MB (G8721) **\$72**
UFD-0064 USB Flash Drive - 64MB (G8722) **\$107**
UFD-0128 USB Flash Drive - 128MB (G8723) **\$176**
UFD-0256 USB Flash Drive - 256MB (G8724) **\$298**
UFD-0512 USB Flash Drive - 512MB (G8725) **\$605**

USB IrDA Infrared Adapter

This adapter is for enabling IrDA wireless data communication through a standard USB port. Transfer data between your desktop PC, notebook or PDA.



UIR-100 USB to IrDA Wireless Adapter (D8944) **\$129**

USB 2.0 & FireWire Host Adapters

Instantly add USB 2.0 or FireWire ports to your notebook or PC and take advantage of transfer speeds of up to 480Mbps.



UCB-402 4 Port USB 2.0 Cardbus (G4199) **\$95**
UPC12-100 5 Port USB 2.0 PCI Adapter (D8945) **\$59**
1394-PCI 3 Port FireWire PCI Adapter (D8946) **\$64**
1394-201 2 Port FireWire Cardbus (G8693) **\$79**
UFPCI-221 Combo PCI Adapter
2 x USB2.0 Ports & 3 x FireWire Ports (G6107) **\$187**

USB 2.0 Docking Station

Connect all your legacy peripherals to almost any notebook or desktop with one single connection. Includes 2 x USB 2.0 Ports, 2 x PS/2 Ports, Printer Port, Serial Port & 10/100 Ethernet.



UDS-102 USB 2.0 Docking Station (G8691) **\$219**

USB 1.1 Mini & Stackable Hubs

Our USB mini hubs are small & lightweight & ideal for notebooks. Our stackable hubs are designed for your desktop and save valuable space.



UH-201M 2 Port USB 1.1 Mini Hub (G1939) **\$28**
UH-401M 4 Port USB 1.1 Mini Hub (G1940) **\$39**
UH-401S 4 Port USB Stackable Hub (G6108) **\$59**
UH-701S 7 Port USB Stackable Hub (G6109) **\$89**

USB Bluetooth Adapter

Plugs directly into your USB port and enables connectivity with other Bluetooth units including notebooks, mobile phones or PDAs.



UBT-100 USB Bluetooth Adapter (G8726) **\$119**

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Direct

www.ht.com.au/cat/comsol

Intelligent KVM Solutions

Avocent KVM Over IP

These all-in-one 16 port switches combine analogue and IP-based KVM switching for local access from your data centre and REMOTE access from anywhere in the world. Avocent's exclusive KVM over IP switching technology supports multi-platform, multi-location and multi-device installations, all over a standard IP connection.

**Supports PC
USB & SUN**



Avocent



- AVR1000** 16 Port KVM over IP - 1 Local User & 1 Remote User
AVR2000 16 Port KVM over IP - 1 Local User & 2 Remote Users
AVRIQ-PS2 AVR Smart Cable - CAT 5 to PS/2 & VGA

Rent* \$62.63/wk (G8455) **\$7,037**
 Rent* \$77.45/wk (G8332) **\$9,237**
 (G8333) **\$217**

Avocent KVM Over CAT 5 UTP

Control hundreds or even thousands of servers from 8 users using Avocent's AMX Series KVM switches. This solution allows you to access your servers from up to 300 metres away using standard CAT 5 UTP RJ45 cabling. It also features full system management with an advanced Java-based administration tool.

**Supports PC
USB & SUN**



Avocent



- AMX5000** 32 Port 8 User Matrix KVM Switch using CAT 5
AMX5100 User Station for AMX5000 - Supports PS/2 & SUN
AMIQ-PS2 AMX Smart Cable - CAT 5 to PS/2 & VGA

Rent* \$99.05/wk (G4502) **\$12,219**
 Rent* \$22.72/wk (G4503) **\$2,027**
 (G4501) **\$355**

ServerLink LCD KVM Switches

With a 15" TFT LCD screen, keyboard, touchpad and integrated KVM switch housed in an industry standard 19" 1U-height rack drawer, these LCD KVM switches save you up to 1/3 of valuable rack cabinet space.

**INTEGRATED
KVM SWITCH**



**SPECIAL
PRICING**

- LKS-101** 1U Console Drawer 15" TFT LCD, KB & mouse Rent* \$38.20/wk (F7677) **\$3,849**
LKS-801 8 Port Single User KVM - LCD Console Drawer Rent* \$39.90/wk (E7463) **\$4,218**
LKS-802 8 Port Dual User KVM - LCD Console Drawer Rent* \$41.52/wk (F7678) **\$4,389**
LKS-1601 16 Port Single User KVM - LCD Console Drawer Rent* \$45.27/wk (E7464) **\$4,785**
LKS-1602 16 Port Dual User KVM - LCD Console Drawer Rent* \$46.96/wk (F7679) **\$5,089**

ServerLink SOHO KVM Switches



- SL-251-P** 2 port KVM inc. 2 x 2m cables (E3692) **\$199**
SL-451-P 4 port KVM inc. 4 x 2m cables (E3694) **\$299**

ServerLink Infinity KVM Switches



- SL-221** 2 port ServerLink KVM for PS2 (B3047) **\$269**
SL-421 4 port ServerLink KVM for PS2 (A9890) **\$349**
SL-821 8 port KVM Rent* \$10.97/wk (97888) **\$979**
SL-1621 16 port KVM Rent* \$17.92/wk (97890) **\$1,599**

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery. **HARRIS TECHNOLOGY.**
*Delivery charges extra.

Avocent

For Avocent's KVM over IP and KVM over CAT 5 switches you will require one CAT 5 Smart Cable per attached server

Computer to ServerLink Cables for PS/2 & VGA



SL-CKP-02
 2MTR (63972) **\$27**

SL-CKP-03
 3MTR (D0973) **\$39**

SL-CKP-05
 5MTR (63976) **\$65**

SL-CKP-10
 10MTR (78218) **\$117**

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Wired Solutions for SMB

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Fortitude
Valley
Business
Centre
**NOW OPEN
IN QLD!**



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Delivery
Australia-
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Direct

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Web
Direct
Link
(at top of page)
for
more
products
and
latest
info!

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**HARRIS
TECHNOLOGY™**

Cable/DSL Firewall Routers



BEFSX41 (G1984) **\$235**

- NAT and Stateful Packet Inspection Firewall to Protect Your PCs from Outside Intruders on the Internet
- Virtual Private Network (VPN) Capabilities for Secure Access of Remote Networks
- Supports Up to Two IPsec Virtual Private Network (VPN) Tunnels

Cable/DSL VPN Router



BEFVP41 (F9066) **\$388**

- Full IPsec Virtual Private Network (VPN) Capability Supports:
 - DES and 3DES Encryption Algorithms
 - MD5 and SHA Authentication Algorithms
 - IKE Key Management
- Up to 70 IPsec Tunnels Simultaneously
- Compatible with other IPsec VPN Products.

10/100 5-port Auto-Sensing Switch



EZXS55W (F9068) **\$95**

- Integrating Your 10BaseT & 100BaseTX Network Hardware
- 10/100 Ports Provide Dedicated Bandwidth in Half or Full-Duplex Modes
- Switched 10/100 Ports Run at 10Mbps, 20Mbps, 100Mbps, or up to 200Mbps
- Advanced Store-and-Forward Packet Switching Optimizes Data Transfers.

EtherFast 8-Port 10/100 Switch



EZXS88W (F9070) **\$159**

- 8 Port 10/100 Switch
- Perfect for Optimizing 10BaseT and 100BaseTX Hardware on the Same Network
- Speeds of Up to 200Mbps in Full Duplex Operation
- Eliminate Bandwidth Constraints and Clear Up Bottlenecks

Compact USB 4 Port Hub



USBHUB4C (G6692) **\$69**

- Ready to Run with USB-Equipped PCs or Notebooks with Windows 98, 2000, ME, and XP
- Use up to 4 USB 1.1 Devices Simultaneously by Connecting the USB Hub to Your PC's USB Port
- Print, Scan, and Surf the Web All at Once

EtherFast 16-port 10/100 Switch



EZXS16W (F9071) **\$275**

- 10BaseT and 100BaseTX Network Hardware
- 16 Auto-Sensing Ports Operate in Half-and Full-Duplex Modes
- Switched 10/100 Ports Run at 10Mbps, 20Mbps, 100Mbps, or up to 200Mbps

PRICING AND SPECIFICATIONS MAY CHANGE. PLEASE REFER TO PAGE 2 FOR DETAILS.



Instant Broadband & Wireless

Wireless™ Compactflash Card

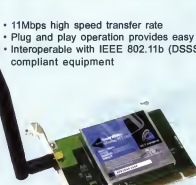
- Up to 11Mbps high-speed data transfer rate with automatic fallback
- 802.11b, DSSS and 2.4GHz compliant
- Supports up to 128-bit WEP encryption security
- Compatible with Microsoft Windows CE 3.0 or higher



WCF12 (G8690) **\$199**

Instant Wireless™ PCI Card

- 11Mbps high speed transfer rate
- Plug and play operation provides easy setup
- Interoperable with IEEE 802.11b (DSSS) 2.4GHz compliant equipment



WMP11 (F8678) **\$245**

Wireless™ USB Network Adapter

- 1Mbps high-speed data transfer rate with automatic fallback
- Compatible with Microsoft Windows 98SE, Me, 2000 and XP
- Supports up to 128-bit WEP encryption security



WUSB11 (F8679) **\$218**

Wireless Access Point Router with 4-Port Switch

- Supports enhanced security using NAT Firewall, ZoneAlarm Pro and PC-cillin software
- Configurable as a DHCP server on your network



HOT Price
BEFW11S4 (F8745) **\$369**

Wireless™ Print Server

- Runs with virtually all laser, ink jet, bubble jet, color and dot matrix printers
- Integrates through both ethernet and wireless connections
- Easy-to-use built-in remote management utility



WPS11 (F9062) **\$359**

Wireless™ PC Card

- 11Mbps high speed transfer rate
- Interoperable with IEEE 802.11b (DSSS) 2.4GHz compliant equipment
- Long operating range (up to 120m indoor)
- Rugged metal design with integrated antenna



WPC11 (F8681) **\$129**

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
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*Delivery charges extra

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on-line?**
**VINTAGE
CELLARS**
vintagecellars.com.au

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NETGEAR™

Prices are subject to change. Check here for latest prices & products!

Web
Direct

www.ht.com.au/cat/netgear

Everybody's Connecting

switches

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
HARRIS TECHNOLOGY
*prices change extra



NETGEAR offer a line of robust switches to match any requirements, whether combinations of UTP and fibre, SNMP managed or unmanaged, mixtures of port speeds or simply a high density of gigabit ports.

Network Cards

FA 311
Ethernet adaptor
10/100Mbps PCI
(A1372)
\$32

FA 312
10/100Mbps wake on LAN ethernet adaptor (A1373)
\$42

FA 411
10/100Mbps PC card (No dongle required)
(B9944)

\$115

FA511
10/100Mbps CardBus PC card (No dongle required)
(D4112)
\$120

HARRIS TECHNOLOGY
Technology Centre at
Officeworks
Chadstone - VIC

Technology Centre Shoppers!
Not all products are in-store, but consulting & advice available on all items.

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FS 516
16 Port 10/100Mbps
Rent* \$7.38/wk (60522) **\$659**

FS 105

FS 108

FS 116

FS 524

24 Port 10/100Mbps

Rent* \$8.95/wk (77549) **\$799**

5 Port 10/100Mbps

8 Port 10/100Mbps

16 Port 10/100Mbps

(84722) **\$138**

(70905) **\$199**

(A5347) **\$399**

FS 524S (Stackable)

24 Port 10/100Mbps

Rent* \$16.53/wk (B6540) **\$1,475**

Modular Solutions



Unmanaged Non-blocking 19" units provide 24 or 48 10/100Mbps, auto-sensing ports with Auto Uplink™ support.

FS726 24 Port

10/100Mbps, 2 module slots.
Rent* \$12.61/wk

(D0873) **\$1,125**

FS750 48 Port

10/100Mbps, 2 module slots.
Rent* \$24.36/wk

(D0874) **\$2,174**

AG711T

Gigabit copper module.
Rent* \$7.38/wk

(D0921) **\$659**

AG711F

Gigabit fibre module.
Rent* \$10.24/wk

(D0924) **\$914**

Gigabit Solutions



Ideal for combining 10, 100 and 1000 Mbps unmanaged devices, automatic speed and full/half duplex sensing plus Auto Uplink™ on every port

GS104 4 Port

10/100/1000Mbps gigabit switch.
Rent* \$13.39/wk

(F7306) **\$1,195**

GS 508T 8 Port

10/100/1000Mbps gigabit switch.
Rent* \$23.57/wk

(B9916) **\$2,375**

GS516T 16 port

10/100/1000Mbps gigabit switch.
Rent* \$36.61/wk

(D5980) **\$3,689**

GS524T 24 Port

10/100/1000Mbps gigabit switch.
Rent* \$44.42/wk

(D5961) **\$4,695**

Managed Solutions



Use built-in Copper Gigabit or GBIC slots. Management includes SNMP, RMON, VLAN, QoS, Port Trunking, Spanning Tree, and Port Mirroring.

FSM 726S

Managed 24 Port

10/100Mbps switch with 2 stacking ports and 2x GBIC slots.
Rent* \$23.48/wk

(D8885) **\$2,095**

FSM 750S

Managed 48 port

10/100Mbps switch with 2 stacking ports and 2x GBIC slots.
Rent* \$30.14/wk

(G4121) **\$3,037**

GSM 712

Managed 10 port

10/100Mbps switch with 2x GBIC slots.
Rent* \$37.00/wk

(F4112) **\$3,728**

print servers

The utmost in simplicity and cost-effectiveness. The special-purpose print servers enable you to connect your printers to a network using the parallel port.



PS 111W
1 port wireless ready print server.
(E5833) **\$205**



PS 101
1 port mini print server.
(E5832) **\$179**

PS 110
10/100Mbps print server, 2 parallel ports.
(67228) **\$259**

PS 113
10/100Mbps print server, 3 parallel ports.
(A3287) **\$345**

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Everybody's Connecting



routers

The NETGEAR range of routers, gateways and firewalls provide simple and secure connectivity to the Internet for both small business and branch offices. All products have NAT firewall security, DHCP and easy installation via web based configuration. VPN pass through is supported on all routers and VPN end point termination is available on certain products. www.netgear.com.au offers specific installation information to suit the Australian market.

M602

High speed ADSL modem with both ethernet and USB connectivity.



(F9650)

\$279

RP614

Cable/DSL web safe router gateway with 4 port 10/100Mbps switch.



(F9645)

\$215

DG814

Integrated DSL modem and router with 4 Port 10/100Mbps switch.



(F5181)

\$399

R328S

Cable/DSL ProSafe Firewall with dialin backup port and 8 port 10/100Mbps switch.

G6240

\$479

FVL328

Cable/DSL ProSafe VPN firewall router with 8 port 10/100 switch. Initiates up to 100 IPsec VPN tunnels simultaneously. Rent* \$15.46/wk (G8576)

\$1,380

NEW

FVS318

Cable/DSL ProSafe VPN firewall with 8 port 10/100Mbps switch. Initiates up to 8 IPsec VPN tunnels simultaneously.



(F0242)

\$452

FR114P

Cable/DSL ProSafe firewall router with integrated 4 port 10/100 switch and print server.



(F0902)

\$295



wireless

NETGEAR offer a comprehensive range of standards based wireless products ranging from the popular 802.11b 11 Mbps products to the blazing speeds offered by 802.11a products in turbo mode. The new dual band a/b products protect customer investment in wireless infrastructure and is compatible with both standards.

802.11b Products - 11Mbps



MA311

11Mbps integrated PCI adaptor.

(F4339) **\$195**

MA101

11Mbps USB adaptor.

(C7110) **\$215**

MA401

11Mbps PCMCIA card.

(C8117) **\$129**

MA701

11Mbps type I / II compact flash card.

(E5891) **\$229**

ME102

11Mbps access point.

(B9929) **\$299**

FM114P

Cable/DSL ProSafe 11Mbps.

(F0904) **\$499**

FVM318

Cable/DSL ProSafe Wireless VPN Firewall with 8 port 10/100Mbps switch. Rent* \$22.92/wk

(G5878) **\$2,045**

NEW

DG824M

ADSL Modem Gateway & firewall with 4 port 10/100Mbps.

(G5880) **\$649**

NEW

802.11a - 54Mbps Products & Dual Band 802.11a/b Products

MA311

54Mbps integrated PCI adaptor.

(F4341) **\$399**

HA501

54Mbps Cardbus PC card.

(E5826) **\$379**

HR314

54Mbps Cable/DSL wireless router.

(F4342) **\$1,049**



Rent* \$11.75/wk

WAB102

11/54Mbps dual band access point.

(G4202) **\$596**

Rent* \$6.68/wk

WAB501

11/54Mbps dual band PC card.

(G4203) **\$305**



Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
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*Delivery charges extra.

Network Cards



GA 302T
32 bit PCI Gigabit Network Card (D4118)
\$97

GA 622T
32/64 Bit PCI Gigabit Network Card (B9943)
\$276

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RENTSMART
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High Speed Internet Access

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About...

ENTER THE
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ADSL with NetComm

Connecting your business network to an ADSL service has never been easier with NetComm's range of ADSL products. Now you can enjoy the full, multi-media power of the Internet - at ultra-high speed, without interruption and without delays. NetComm ADSL is simple to install, set up and use. NetComm's range of ADSL products have all been researched and developed to work with all major Australian ISP's, you'll be up and running in next to no time.

NB1200

High Speed ADSL modem with USB connectivity.
Approved for connection to Telstra's ADSL network.

Includes
FREE
Microfilter!

(F8602) **\$199**



NB1300

High speed ADSL modem with both Ethernet & USB connectivity.
Approved for connection to Telstra's ADSL network.



(G4025) **\$275**



NB3300

Integrated ADSL modem and router with 4 port 10/100 switch.

- Easy web interface
- NAT security and internet sharing
- Supports PPPoA, PPPoE, PPTP and bridged protocols
- IP port filtering, IPsec passthrough, remote access, DMZ hosting, DHCP

(F3590) **\$429**



NETCOMM DSL ROUTERS

The NetComm range of Cable/DSL routers delivers solutions to fit individual customer needs. NetComm routers are the perfect plug and play option to connect multiple PCs to a high-speed broadband Internet connection or to an Ethernet backbone. All products offer shared internet access with NAT Firewall security and easy installation via web based configuration.

NB3000 Cable/DSL Wireless Router

- Built-in Telstra cable connection
- 4-port 10/100 switch
- Wireless range > 90 metres indoors!

Wireless speeds and range may vary depending on locations.

(F3588) **\$465**



NB3100 Cable/DSL Firewall Router

- SPI (Stateful Packet Inspection)
- Supports Denial of Service Prevention and URL filtering
- Can block all Java, ActiveX code and cookies
- Supports VPN, IPsec and PPTP pass-through
- Supports up to 2 simultaneous VPN tunnels
- 4-port 10/100 switch

(F3589) **\$285**



NB3200 Cable/DSL VPN Router

- Provides full IPsec VPN tunnelling and firewall protection
- Supports up to 70 simultaneous VPN tunnels
- 4-port 10/100 switch
- Easy web interface

(F3586) **\$425**



SM4200 Smart I-Share 56K Analogue Modem/Router

Four PCs can connect and share Internet access using a single phone line and just one ISP account. Simply add a network switch to connect more than 4 PCs. Complete with inbuilt firewall protection and 56K modem.

(A8868) **\$465**



PRICING AND SPECIFICATIONS MAY CHANGE. PLEASE REFER TO PAGE 2 FOR DETAILS.



FINANCE METHODS ARE SUBJECT TO APPROVAL

Networking & Communications Converged

NetComm Fast Ethernet Switches and Gigabit Solutions

NetComm switches deliver high performance 10/100 and Gigabit technology to both large and small networks in a compact affordable package.

NP2005

5 port 10/100 auto-sensing switch

(D0966) **\$129**



NP2008

8 port 10/100 auto-sensing switch

(D0967) **\$189**

NP2160

16 port 10/100 auto-sensing professional switch
(19-inch rack-mount kit)



(E7322) **\$558**

NP2240

24 port 10/100 auto-sensing professional switch
(19-inch rack-mount kit)



(E7323) **\$745**

NP2480

26 port 10/100 Gigabit switch,
24 10/100Mbps auto-sensing and 2 1000Base-SX
Copper Gigabit Ethernet Port (19-inch rack-mount kit)



(F9533) **\$1,702**

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in stock at all
stores but can be
ordered for Pick-
up or Delivery.
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*Delivery charges extra

NETCOMM Print Servers



NP3620PS

1 port Mini
Print Server
(92351)

\$199



NP5300PS

10/100Mbps
print server,
3 parallel
ports.

(92346)

\$398

Connect
your printers
to a network
quickly and
easily.

NetComm Fast Ethernet Adaptors

NP1100

High performance 32-bit
10/100 PCI LAN Card

(E7333) **\$19**



NP1200

10/100 Fast Ethernet
32-bit PCCard

(D1166) **\$99**



NP1010

USB LAN Key 10/100
Fast Ethernet Adaptor

(C7651) **\$69**



NP1300

Connect your PDA to your LAN. 10base-T Compact
Flash LAN Adaptor. Comes with PCMCIA adaptor
included for use in notebooks.

(D4201) **\$135**



NP1800

32-bit PCI Gigabit Network Card

(G6483) **\$128**



NP1500

Enhanced 32-bit Intel based 10/100Mbps
network card specifically developed
with business users in mind.

(G6482) **\$99**



NP1880

32/64-bit PCI Gigabit
Network Card RRP \$199

(G6484) **\$169**



NetComm 802.11b Wireless Networking

NP7000 Wireless Access Point

11Mbps full-featured Wireless Access Point that acts as a bridge
between the wired Ethernet backbone and your wireless clients.



(D4196) **\$439**

NP7030 Wireless PC Card

Provides high speed wireless networking and secure access to
network resources and the Internet.



(D4198) **\$179**

NP7040 Wireless USB Adaptor

Provides high speed wireless Internet access and networking for
USB-enabled desktop PCs or notebooks.



(D4199) **\$194**



Next Generation Backup Solutions

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*Delivery charges extra.

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WINNER**

MEDIA

DLT Tape
Media IIIXT
15/30GB Tape

(68362)

\$79

DLT Tape IV
Media 20/
80GB

(71231)

\$125

DLT Cleaning
Tapes

(97851)

\$83

Super DLT
Media
110/220 GB

(B9825)

\$237

LTO Ultrium
100/200 GB

Tape

(D1500)

\$179

The LoaderXpress is a family of autoloaders which combine the latest drive technology with field-proven and award winning robotics first introduced by Overland. This line is an excellent entry point for users who require tape automation on a modest budget. LoaderXpress products support the LATEST in tape technology.

LoaderXpress

- DLT1, DLT8000, SuperDLT - up to 1.1TB, 10 Cartridges
- LTO Ultrium - up to 1.1TB, 11 Cartridges
- AIT-1 - 665GB, 19 Cartridges, 1 drive, upgradeable to 2 (AIT-1)



PowerLoader

LXM1L117TB Single LTO Tape Drive 17 tape capacity

Rent* \$109.15/wk (F3168) **\$13,465**

LXM8115TB Single DLT8000 Tape Drive 15 tape capacity

Rent* \$116.60/wk (F3171) **\$14,384**

LXM1S115TB Single SuperDLT 220 BRC Drive 15 tape capacity

Rent* \$191.90/wk (F3175) **\$23,849**

A standalone library that is also scalable up to 17.1TB and up to 8 drives offering high performance and data storage growth. The AIT LibraryPro is the first modular library available in the market using the AIT drive technology.

AIT LibraryPro

- AIT-2, AIT-3 drives - 950GB, 1900GB, 19 Cartridges
- 1 or 2 drives - field-upgradeable and stackable, bar code reader std.

LP2L119TB Single AIT-2 Tape Drive

Rent* \$121.96/wk (F3177) **\$15,042**

LP3L119TB Single AIT-3 Tape Drive

Rent* \$157.50/wk (F3179) **\$19,572**

The Neo series is the newest library family from Overland and it provides unprecedented levels of availability through Non-Stop Operation, investment protection through SmartScale Architecture, and flexible connectivity to direct attach or SAN environments through Virtual Interface Architecture.

Neo Series 2000

- DLT8000, SuperDLT, LTO Ultrium - up to 4.2TB
- 1 or 2 drives - field-upgradeable
- 26 (DLT8000, SDLT) or 30 (LTO) cartridges



LXN212678L Single DLT8000

Tape Drive Rent* \$192.89/wk

(F3180) **\$23,976**

LXN212671SL Single SDLT220

Tape Drive

(F3182) **\$30,095**

LXN212672SL Single SDLT320

Tape Drive

(F4315) **\$30,695**

LXN213071UL Single LTO

Ultrium Tape Drive Rent* \$233.11/wk

(F3185) **\$28,975**

Distributed Robotic Architecture provides industry's first scalable data storage library with remote browser accessible library management and Optional fibre channel interface.

SuperDLT Tape Drives: Quantum manufactured



DLT220/S Int 110/220GB

Rent* \$68.52/wk (B9821) **\$7,698**

DLT220/ST Ext 110/220GB

Rent* \$71.16/wk (B9823) **\$7,995**

DLT320/S Int 160/320GB

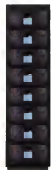
Rent* \$77.47/wk (F3197) **\$9,239**

DLT320/ST Ext 160/320GB

Rent* \$82.16/wk (F3198) **\$9,799**

Neo Series 2000 System

- up to 33TB native
- up to 16 drives
- up to 240 cartridges



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Best Storage Solutions

d2 External Hard Disks

LaCie d2 range is a professional flexible system. "Made of extruded aluminium and Zamac alloy, which are the same materials used in Formula 1 car design for their unique features: robustness, lightweight and fast cooling." Kensington cable lock and power lock for better security. Front power button and blue activity LED, switches on/off with your computer. Supplied with drivers for PC. Drives can be used stacked horizontally or can be mounted in a 1U 19" rack (kit sold separately).



Stackable

80GB	7200rpm	USB 2.0
120GB	7200rpm	USB 2.0
200GB	7200rpm	USB 2.0

Rent* \$7.03/wk
Rent* \$10.92/wk

(G1817)	\$485
(G1281)	\$628
(G4245)	\$975

Free Security
Keylock
cable with
400GB HD



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Delivery charges apply.

LaCie PCI card USB 4 ports
(G4157)
\$49

FireWire 4 ports
(G8509)
\$49



Rack mountable

80GB	7200rpm	FireWire
120GB	7200rpm	FireWire
200GB	7200rpm	FireWire
400GB	7200rpm	FireWire

Rent* \$7.03/wk
Rent* \$10.92/wk
Rent* \$19.92/wk

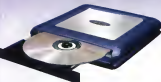
(G1744)	\$485
(F7923)	\$628
(G3138)	\$975
(G8543)	\$1,778

Pocket CD-Recorders



CD-RW Fusion
24/12/40 USB 2.0
(F7291) **\$299**

The LaCie Fusion CD-RW is made of sleek aluminium. Includes EZ CD Creator for PC.



CD-RW 24/10/24
USB 2.0 & FireWire
(G1908) **\$525**

The LaCie Pocket CD-RW is made of aluminium and moulded silicon bumpers to protect this slim unit. Includes EZ CD Creator burning software.

Pocket Hard Disks

LaCie Pocket hard disks are the most robust and mobile drives on the market. Made of light aluminium for better cooling and fully moulded in a silicon bumper for better protection of the drive. Includes USB 2.0 and bus powered FireWire interface, complementary power supply and drivers.

20GB USB 2.0 & FireWire

(F5369) **\$489**
Rent* \$6.56/wk

40GB USB 2.0 & FireWire

(F5371) **\$585**
Rent* \$9.23

60GB USB 2.0 & FireWire

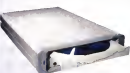
(G6146) **\$824**



LaCie Floppy USB
(F8125)
\$109

d2 External CD-RW/DVD-R/RW

The LaCie CD-R/DVD-R/RW comes complete with all software in the new d2 casing, all cables and first media. Silent and efficient, they are the best professional burners on the market at the most affordable price.



DVD-R/RW/CD-R/RW (A05)
USB 2.0 & FireWire
Rent* \$9.80/wk (G0456)

\$875

CD-RW 48/24/48 USB 2.0 (G4178) **\$350**

CD-RW 48/24/48 FireWire (G0455) **\$377**

d2 External AIT Tapes

The perfect drive to back up all your data automatically. LaCie d2 tape drives include 1" cartridge, cables and Retrospect desktop v5.

NEW



AIT-1 (35GB) USB2.0 & FireWire

Rent* \$22.51/wk (G1075) **\$2,009**

AIT-2 (50GB) USB2.0 & FireWire

Rent* \$28.82/wk (G8563) **\$2,904**

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Collect Fly Buys points on your computer hardware & software when you purchase from **HARRIS TECHNOLOGY.**

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Peripherals and Accessories

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Pocket PC Accessories

CompactFlash Modem



(83607) **\$235**

CompactFlash WLAN Card



(G3838) **\$257**

CompactFlash GPS Card



(E5015) **\$475**

Compact Camera



NEW

(F0865)

\$249

Compact Bluetooth



NEW

(F0866)

\$259

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Digital Memory Readers

CompactFlash

(F0861)

\$38

MemoryStick

(F0864)

\$38

Secure Digital/MultiMediaCard

(F0863)

\$38

SmartMedia

(F0862)

\$38

USB Connectivity, Portable
Compact Design, Hot swappable.

Multi Card Reader

USB 1.1 (F5533)

\$77

USB 2.0 (G3844)

\$98



Digital Memory Cards

CompactFlash

32MB CompactFlash (B2921)

\$49

64MB CompactFlash (B2922)

\$78

128MB CompactFlash (B2923)

\$135

256MB CompactFlash (C0777)

\$252

512MB CompactFlash (E1225)

\$517

SmartMedia

16MB SmartMedia (B2915)

\$26

32MB SmartMedia (B2916)

\$39

64MB SmartMedia (B2917)

\$69

128MB SmartMedia (C3680)

\$139

SecureDigital Cards

16MB SecureDigital (D4115)

\$49

32MB SecureDigital (D4116)

\$84

64MB SecureDigital (D4117)

\$123

128MB SecureDigital (D5918)

\$249

MultiMedia Cards

32MB MultiMediaCard (B9873)

\$49

64MB MultiMediaCard (B9878)

\$105

128MB MultiMediaCard (F7833)

\$229

Expansion Cards

FIREWIRE



Cardbus FireWire Card

(B9849)

\$88

For Desktops



PCI FireWire Card (90689)

\$49



PCI FireWire USB 2.0 Combo Card (E5013)

\$152

USB 2.0

USB 2.0 Cardbus Card

(E6328)

\$88



PCI USB 2.0 Card (F2992)

\$49

I/O CARDS

IDE Ultra DMA

133 Raid Card

(E7377)

\$85



Ultra-SCSI Card

(90681)

\$69



Also available
Serial Cards,
Parallel Cards,
USB Hubs and
FireWire Hubs.

CD and DVD Media: Storage for Life

DataLifePlus CD-R - 48x



NEW
80min.
700MB 1x - 48x
10 Pack
(G1680) **\$11**

Digital Vinyl CD-R



Designed to look like a vinyl record these eye-catching discs are a great way to save delicate LP collections or make a standout business presentation.

80min Vinyl CD-R
10 pack
(G1731) **\$12**

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
HARRIS TECHNOLOGY.
*Delivery charges extra.

MusicLifePlus CD-R Audio



80min.
10 Pack
(C7889) **\$13**

Pocket Colours 8cm CD-R



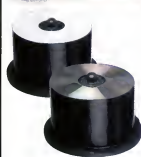
Mini CD's that fit in your pocket! Store up to 3 hours of MP3's or up to 185MB of pictures, files or any data you like. Compatible with any standard tray based CD player or burner.

80min.
Singles
(D0011) **\$2**

21Min, 185MB
1x - 16x 5 Pack
(D9192) **\$8**

21Min, 185MB
1x-16x 10 Pack
(C9459) **\$15**

Printable CD-R Media



In spindles of 50 inkjet printable
80min 48x.
(G1742) **\$42**

Silver thermal printable
80min 24x.
(D0562) **\$42**

DataLifePlus Colours CD-R



80 Min. 700MB
coloured CD-R's
in a 25 pack 48x
(G2890) **\$28**

80 Min. 700MB
coloured CD-R's
in a 10 pack 48x
(G2015) **\$11**

DataLifePlus Spindles



NEW
80min DataLifePlus
Spindle 30 Pack 48x
(G5999) **\$27**

80min DataLifePlus
Spindle 50 Pack 48x
(G6467) **\$43**

DataLifePlus CD-RW



700MB CD Rewritable
2x - 4x 5 pack colours
(D9230) **\$8**

650MB 2x - 4x
singles (77492) **\$2**

650MB 16x -24x Ultra
speed singles
(G1741) **\$2**

650MB 4x -12x High speed
5 pack
(G6434) **\$11**

Verbatim DVD Media DVD-R



4.7GB DVD-R for general data - singles in Video case
(G7819) **\$11**
Printable surface & Jewel case discs also available

DVD-RW



4.7GB DVD-RW (version 1.1) - singles
(C8841) **\$12**

DVD+R



NEW
4.7GB DVD+R - 5 pack in video case
(G6468) **\$53**
Printable Surface & Jewel case also available

DVD+RW



4.7GB DVD+RW - singles
(D9166) **\$12**

Verbatim DataLifePlus CD's represent the latest in technology. Featuring a proprietary blue Super-Azo dye which has the best resistance to sunlight, silver reflective layer for optimum read and write performance and multispeed recording.

Did you know...



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Outstanding Performance & Reliability

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*Delivery charges extra.

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(at top of page) for more products and latest info!

Ask About...



- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base of Warranty Extension to On-Site

JAN FEB
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Maxtor® Fireball 3

- 3.5-Inch 5400RPM
- Entry-Class hard drives
- Capacity up to 40GB
- Fast ATA/Enhanced IDE compatible
- Digital signal processor (DSP)-based architecture
- Ultra ATA/133 data transfer speed
- 2MB SDRAM cache buffer

40GB (G0792) **\$189**

Fireball 3



Maxtor® DiamondMax® 16

- 3.5-Inch 5400RPM
- Capacity-Class Hard Drives
- Capacity up to 160GB
- Parallel ATA data transfer speeds up to 133 MB/Sec
- 2MB cache buffer
- Quiet drive technology
- Shock and data protection system

160GB Rent* \$7.25/wk (G0783) **\$639** DiamondMax 16



Maxtor® DiamondMax® Plus 8

- 3.5-Inch 7200RPM
- Mainstream Performance-Class Hard Drives
- Capacities Up To 40GB
- Fast ATA/Enhanced IDE compatible
- Ultra ATA data transfer speeds up to 133 MB/Sec
- 2MB cache buffer
- Quiet drive technology FDB (Fluid Dynamic Bearing) motors
- Shock and data protection system

40GB (G0646) **\$205**

DiamondMax PLUS 8



Maxtor® DiamondMax® Plus 9

- 3.5-Inch 7200RPM
- Performance-Class Hard Drives
- Capacities Up To 160GB
- Fast ATA/Enhanced IDE compatible
- Ultra ATA data transfer speeds up to 133 MB/Sec
- Serial ATA option with transfer speeds up to 150 MB/Sec
- 100% FDB (fluid dynamic bearing) motors
- 2MB and 8MB cache buffer
- Shock and data protection system

160GB Rent* \$7.68/wk (G4775) **\$686**

DiamondMax PLUS 9



Maxtor® Atlas™ 10K III

Maxtor Atlas™ 10K III disk drives provide outstanding performance for data-intensive applications, with 10,000RPM, an ultra320 SCSI interface, and Maxtor's Shock Protection System III (SPS III).

36.7GB Rent* \$6.20/wk (D4615)

\$554

73.4GB Rent* \$14.15/wk (D5940)

\$1,263

Atlas.10K III



New external hard drives

Your Best Ideas Need Maxtor OneTouch™



Easy - Just push the button to make a backup copy of your files.

Fast - Back up files faster than floppy, CD or removable cartridge systems.

Convenient - Make backup copies of your files, while you work, with a simple push of a button.

Flexible - Use Maxtor OneTouch™ or run automated, unattended backups with Dantz® Retrospect® Express.

Quick and Easy Installation

- 1 Install the software
- 2 Plug in the drive
- 3 Push the button and follow the on-screen directions

PERSONAL STORAGE

5000LE

Ideal for home or office, the Maxtor Personal Storage™ 5000LE external hard drive quickly adds storage and organisational space through your computer's USB port.



Perfect for home or office
Exclusive Maxtor OneTouch 80GB

80GB (G4110)

\$449

- Easy add-on storage for home or office
- Perfect for photos, music and documents
- Maxtor OneTouch™: the easy way to make backup copies of your files
- Dantz® Retrospect® Express software included
- USB 2.0/1.1 compatible
- Up to 480MB/sec data transfer rate
- Quick and easy installation
- Maxtor award-winning hard drive technology
- Stands vertically or horizontally

PERSONAL STORAGE

5000DV

The Maxtor 7200RPM hard drive featuring both FireWire (IEEE1394, i.LINK®) and USB 2.0 interface ports gives you one of the most versatile drives available for your PC.



Perfect for video editing and high-end graphics
Exclusive Maxtor OneTouch™ 120GB

120GB Rent* \$7.27/wk (G4112)

\$649

- Versatile add-on storage for editing videos and high-end graphics files
- Maxtor OneTouch™: the easy way to make backup copies of your files
- Dantz® Retrospect® Express software
- Quick and easy installation
- Flexible dual interfaces—FireWire® and USB 2.0/1.1 compatible
- Powerful performance—7200RPM

PERSONAL STORAGE

5000XT

Flexible add-on storage for your home or office, with room to grow. With 250GB, the Maxtor external hard drive provides you with enough capacity to hold and organize your storage-hungry applications and files.



Perfect for storage-hungry files
Exclusive Maxtor OneTouch™ 250GB

250GB Rent* \$10.07/wk (G4113)

\$899

- Flexible add-on storage for storage-hungry files
- Maxtor OneTouch™: the easy way to make backup copies of your files
- Dantz® Retrospect® Express software included
- Quick and easy installation
- Flexible dual interfaces—FireWire® and USB 2.0/1.1 compatible
- Expandable storage
- Stands vertically or horizontally
- Hot-swappable

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
HARRIS TECHNOLOGY.

*Delivery charge extra.

Wine on-line?



vintagecellars.com.au



Fast Delivery Australia-Wide

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Smart Storage Solutions

Not all items are
in stock at all
stores but can be
ordered for Pick-
up or Delivery.
HARRIS
TECHNOLOGY.

*Delivery charges extra

i
omega

NEW!

Zip 750MB
2 pack disk
(F9779)

\$59

Zip 750MB
10 pack disk
(F9780)

\$298

Zip 100MB
disk
(23772)

\$19

10-pack
(21889)

\$189

Zip drive
carry case
(31823)

\$49

Zip disk
250MB
(74454)

\$29

Zip disk
250MB
10 Pack
(74452)

\$249

Zip 750MB Drive

More speed and more capacity, this NEW 750MB drive and disk is the fastest and most durable, portable storage solution to back up your important data. Iomega Automatic Backup software makes backup a snap and Iomega Sync software helps transfer files between computers. Zip 750MB drives and disks are the smart data storage choice.



USB 2.0 (F9601) **\$419**

Firewire (G2978) **\$429**

External Hard Disk Drive

Iomega External Hard Drive adds secure storage easily and quickly. It comes complete with Iomega Sync™ and Automatic BackUp™ disaster recovery software to protect your files.



USB 2.0 80GB Rent* \$7.05/wk (F9625) **\$629**

USB 2.0 120GB Rent* \$8.95/wk (F9789) **\$799**

Zip 100 USB Powered

An affordable total storage solution as easy to use, but far superior to the floppy drive. Iomega's Zip® 100MB USB-Powered drive is affordable, reliable, easy to use and has a sleek, durable design powered through the USB cable for complete plug-and-play compatibility.



(D0587) **\$165**

Portable Hard Disk Drive

Iomega portable hard drive is a complete solution that makes security, recovery and data storage easy. QuikSync™ automatic back-up and disaster recovery software protects your files. Built in a durable, slim design that's easy to take with you.



USB2 Card sold separately **USB 2.0 20GB (G4671) \$439**

USB 2.0 40GB (F9794) \$495

NAS Servers

Choose Iomega for easy-to-install and manage network storage solutions that allow multi-platform file sharing and data consolidation. Hot-swappable drives and RAID 5 data protection, Iomega NAS servers deliver enterprise class data access and reliability for small business budgets. Plus, you choose the capacity, OS, level of performance and data reliability – so you get the optimum data storage and backup solution.



160GB Unix-based Rent* \$48.38/wk (F9749) **\$5,245**

320GB Unix-based Rent* \$66.38/wk (F9751) **\$7,458**

480GB Unix-based Rent* \$76.59/wk (F9829) **\$9,135**

160GB Microsoft-based Rent* \$60.52/wk (F9756) **\$6,799**

320GB Microsoft-based Rent* \$75.11/wk (F9769) **\$8,950**

480GB Microsoft-based Rent* \$92.05/wk (F9830) **\$10,970**

CD-RW 48x24x48x USB 2.0

For the fastest and easiest way to save and share music, photos and more, choose an Iomega® CD-RW drive. With up to 48x24x48x write, rewrite, read speeds you can burn a 60-minute CD in less than 3 minutes. Includes plug-and-play functionality for portability, buffer under-run protection for reliability and Iomega HotBurn® Pro software with advanced functionality for easy CD customisation, burning MP3s and organising digital photos.



(G4143) **\$435**

Host Powered 250 USB

NEW – Host-powered Zip® 250MB USB drive. Now it's even easier to take your information with you. The Zip® 250 USB drive is now available with a USB cable that provides both data and power, so you don't need any external power source. Its easy to connect (just plug it in) and easy to launch (no rebooting)! This new drive is compatible with most major operating systems and all Zip® 100MB and 250MB Zip® disks.



(B6404) **\$319**

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Pioneer

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Web Direct

www.ht.com.au/cat/pioneer

Multimedia: DVD & Blank Media

Now even faster! 4x DVD-R 2x DVD-RW

DVR-A05



DVD-R/RW Writer
CD-R/RW Writer



FEATURES:

- DVD - 4x write, 2x re-write, 12x read
- CD - 16x write, 8x re-write, 32x read

Faster writing:

Writing a full 4.7GB DVD-R disc can now take just 15 minutes instead of what was once an hour-long process



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*Delivery charges extra.

Pioneer
DVD-R MEDIA



DVD-R 4x
50 Disc
Spindle
DVS-
R47BD50F
4.7GB Single
Sided
(G8790)

\$409



INCLUDES COMPREHENSIVE SOFTWARE PACKAGE

- DVD Workshop SE
- VideoStudio 6.0 SE DVD
- PictureShow SE
- Veritas RecordNow DX
- DLA & Simple Backup
- PowerDVD XP
- DVD Authoring example CD
- DVD Authoring Package
- Video Editing Suite
- Burn your still images onto DVD
- High performance CD or DVD recording
- Write data files to CD or DVD
- For DVD movie playback
- 1 x DVD-R media
- 1 x DVD-RW media

DVR-A05

Rent \$7.83/wk (G2070)

\$699

NEW

ReelDVDTM Make professional DVDs PRO KIT

Includes ReelDVD LE
Professional authoring software
DVDi! PE

MPEG1/2 Encoder
Plus complete software bundle as with the DVRA05

Rent* \$19.04/wk

(G8434) **\$1,699**

DVR-105EXT

Portable storage device

DVD-R/RW/CD-R/RW drive in firewire (IEEE1394) / USB 2.0 external case.

SOFTWARE INCLUDED:

Same as DVR-A05

Bonus Arcsoft Showbiz Video Editing Software
Comes bundled with product while stocks last!

Rent* \$11.19/wk (G6779)

\$999



Printable DVD-R 4x

50 Disc
Spindle
White
Thermal/Inkjet
Printable
Printable to maximum surface
DV-
RN47BPD50F
4.7GB Single
Sided
(G3174)

\$575

HIGH SPEED DVD MEDIA



DVS-R47BF 4x DVD-R
General media with slim jewel case

(G2072) **\$10**



DVS-RP47BF 4x DVD-R
Thermal / Inkjet printable with slim jewel case

(G2073) **\$12**



DVS-R47BP5F 4x DVD-R
5 Pack with slim jewel cases

(G2074) **\$45**



DVS-RW47CF 2x DVD-RW
with slim jewel case

(G2075) **\$15**

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Fax: 1300 13 6666

Web: www.ht.com.au

Email: sales@ht.com.au



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for Locations

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Microsoft®

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Direct

www.ht.com.au/cat/microsoft

New Microsoft PC Games & Home Productivity

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*ENCARTA \$100 Cashback offer

Summary of terms & conditions.

Please refer to coupon. Cashback offer expires March 31, 2003. Coupon must be received by April 30, 2003. Cashback is only available for retail purchases of genuine fully boxed retail version. In Australia, if you have questions about this offer, go to www.microsoft.com/australia/offers or call 13 20 58 Monday to Friday 9 am until 6 pm EST. No rebates will be authorised over the phone. Please allow 6-8 weeks for delivery of your cashback. This offer allows one cashback of \$100 per coupon per household.

**Microsoft Works Suite

To be eligible for Microsoft Works Suite, you must be a licensed user of any one of the following Microsoft® applications: Word (all versions), Word (version 6.0 or later for MS Dos, Windows and Windows NT Workstation), WordPerfect for MS-DOS (4.0 to 5.1), WordPerfect for Windows (5.1 - 9), Productivity Suites from Novell and Corel which contain these WordPerfect versions.

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NEW!

Microsoft® Impossible Creatures



Impossible Creatures is a revolutionary 3D Real Time Strategy game from Microsoft and Relic Entertainment, developer of the blockbuster - Homeworld. Set in the 1930's, it pits the player against an evil madman in a desperate campaign across a chain of remote and diverse islands. Using Earth's most formidable animals as building blocks, the player creates an army of unique, mutant monsters in a struggle to protect an unsuspecting world.

(G8278) **\$84**

**\$100
Cashback
offer***

Microsoft® Encarta Premium Suite 2003 CD/DVD

Encarta 2003 packed with Australian content. Access information that changes with our changing world. A wealth of relevant information on virtually any subject. The innovative Encarta learning tools help students learn more and achieve more. New Homework Starters provide students with resources to better understand and plan for assignments.

CD Edition

Available in CD & DVD Formats

(F8725) **\$165**



NEW!

Microsoft® Digital Image Pro 7.0



Picture It! Digital Image Pro puts you in control of your photos through a unique combination of powerful digital imaging tools with helpful wizards and professional quality photo projects. Picture It! Digital Image Pro offers advanced tools that let you make your digital pictures look the way you want them to. Choose from over 3,000

professional photo projects or a wide variety of special effects to enhance your photos. (F8723) **\$179**

NEW!

Microsoft® Works Suite 2003**



Works Suite 2003 provides 5 popular Microsoft software titles for your home PC for one low price. Works Suite brings together the full versions of Microsoft Word, Works, Money Standard, Encarta Standard and Picture It! all in one, easy to use package. Conditions apply, see sidebar for details.

(F8718) **\$175**

Microsoft Hardware

NEW!

Optical Mouse Blue The Mouse that Brightens your Desktop



Turn any desktop into a bright, vibrant, space. Microsoft Optical Mouse Blue includes a wider, clear scroll wheel, with a signature red optical glow, all in a fun design. Roll and scroll in style!

Benefits:

- Unique Clear Scroll Wheel
- Fun Optical Glow - No mouse ball!
- Comfort for Either Hand
- Dazzling Design

(F9311) **\$55**

NEW!

Notebook Optical Mouse Captures over 6000 frames per second



The superior tracking speed translates into smooth, accurate cursor performance & works on most surfaces. An eye-catching translucent look & wider design makes users scroll through files & have fun. Features Microsoft's Optical Technology for smooth & accurate performance. Connects to a rectangular Universal Serial Bus port for plug-n-play convenience.

(G3159) **\$67**

NEW!

Multimedia Keyboard The Multimedia Keyboard That Fits Your Digital Lifestyle



Now there's a keyboard that maximises your digital experience! One-touch buttons take you directly to your favourite multimedia activities - navigate music and video clips, surf the Web, start the

programs you use most, and more.

(F9313) **\$74**

NEW!

Wireless Optical Desktop Discover a complete wireless solution that frees your desktop from clutter



Get everything you've always wanted with a keyboard and mouse in one package - wireless freedom, stylish looks, and one-touch features. With customisable keys, optical mouse technology, and a cool

design, it's the all-in-one desktop solution. Performance and style look better than ever.

(G4210) **\$199**

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Director
Colin Rye

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RENT

FINANCE METHODS
ARE SUBJECT TO
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Surround Yourself With The Very Best

MX™ 700 Cordless Optical Mouse



MX Optical Engine responds instantly to the fastest movement. Fast RF cordless technology delivers high performance without a cord. Cruise Control enables continuous scrolling in long documents. Always ready to work with the included rapid charge station. 5-year warranty.

optical

(G2474) **\$189**

QuickCam® for Notebooks Pro



This ultra-portable webcam features a high-quality VGA CCD sensor and includes an integrated mount and built-in microphone. Bring your instant messages to life by adding live video, e-mail photos and videos or make live video calls. 2-year warranty.

NEW

(G2810) **\$219**

QuickCam® Pro 4000



This premium webcam lets you express your creativity like a pro. Capture, edit and share high-quality videos, up to 1.3 megapixel photos and add video to your instant messages. 2-year warranty.

NEW

(F8835) **\$227**

Cordless Elite Duo™ Bundle

Cordless Elite Duo combines the ultimate ultra-flat cordless keyboard with the high-performance Cordless MouseMan Optical for maximum freedom, performance and style. 5-year warranty.

NEW

optical



(G2807) **\$225**

Pocket Digital™ Camera



Pocket Digital is a credit card sized camera that lets you take pictures wherever you are. It comes in a sleek aluminium design that fits into your pocket. Capture up to 52 high resolution pictures up to 1.3 megapixels, then download them to your PC with a single click. USB connection. 2-year warranty.

(F0257) **\$245**

Logitech® Z640 Speakers

Experience home-theatre sound on your PC with this 5.1 speaker system. Its revolutionary subwoofer delivers twice the bass of similar systems and five satellites provide silky-smooth mid and high frequencies. 51 watts RMS.

NEW



(G2806) **\$199**

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HARRIS TECHNOLOGY.
Delivery charges extra.

 Logitech

QuickCam Zoom



(G2802)

\$188

Optical Mouse
optical



(B9948)

\$45

QuickCam Express



(D5894)

\$99

Elite Keyboard



(F4395)

\$88

Access Keyboard



(F7292)

\$38

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Extraordinary Digital

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HARRIS TECHNOLOGY™

Coolpix Cameras

Coolpix 3500 3.0 Mega Pixels

- Pocket sized • Style with a twist
- 3x optical zoom and up to 4x digital zoom • 12 Scene modes • Small picture mode for easy emails • One button transfer • Quick review function.
- Re-chargeable Li-ion battery and charger.



Rent* \$10.07 /wk (G8428) **\$899^{RRP}**

Coolpix 4300 4.0 Mega Pixels

- 3 x Optical Zoom, 4cm close up macro
- 12 'Scene' modes • Movies • One button transfer
- Re-chargeable Li-ion battery and charger.



Rent* \$12.30/wk (G1815) **\$1,098**

Coolpix 4500 4.0 Mega Pixels

- 4x optical zoom with digital zoom up to 4x • 2cm macro close up • 16 scene modes • Voice memo function • 5-Area multi-autofocus • Panorama assist feature helps stitching panoramas • Small picture feature for emails • Perspective control helps to 'straighten' converging lines • One button transfer of images. • Re-chargeable Li-ion battery and charger.



Rent* \$16.80/wk (F4003) **\$1,499**

Coolpix 2000 2.0 Mega Pixels

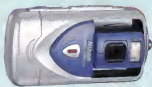
- 3 x optical zoom with digital zoom up to 2.5x • 5 Scene Modes with easy mode dial • Movie mode • Easy upload transfer button • Small pic feature for email • AA batteries.



(F4002) **\$495**

Coolpix 2500 2.0 Mega Pixels

- Pocket sized • Style with a twist
- 3x optical zoom and up to 4x digital zoom • 12 Scene modes • Small picture mode for easy emails • One button transfer • Quick review function.
- Re-chargeable Li-ion battery and charger.



Rent* \$7.67/wk (E5781) **\$685**



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FINANCE METHODS ARE SUBJECT TO APPROVAL.

Kodak

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Web Direct

www.ht.com.au/cat/kodak

Share Moments. Share Life™

Kodak CX4300 3.2 Mega Pixel



Shoot, Touch, Share
your memories easily

- 2x digital zoom
- 3.2 Mega Pixel
- 16MB internal memory, expansion slot for an SD/MMC card, auto rotating of image

(G8297)

\$475 NEW

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Delivery charges apply.

Kodak LS443 4.0 Mega Pixel

Introducing the Kodak EasyShare LS443 zoom digital camera

- 4.0 Mega Pixel
- 10x zoom (3x optical, 3.3x digital)
- Focus distance: 0.6m (2ft.) to infinity
- Integrated lens protection

Rent* \$13.39/wk (G1816)

\$1,195



Kodak DX4330 3.1 Mega Pixel

EasyShare zoom digital camera

- 3.1 Mega Pixel
- 10x zoom (3x optical, 3.3x digital)
- 16MB internal memory
- New: share button on camera
- Kodak colour science technology
- Compatible with optional Kodak EasyShare camera dock



Rent* \$8.31 (F9806)

\$742

Kodak DX4900 4.0 Mega Pixel

The first print-optimised Camera

- 4.0 Mega Pixel
- 6x zoom (2x optical 3x digital)
- 3 sharpness models
- Flash modes: auto, fill, red-eye, off
- ISO settings 100, 200, 400
- White balance modes Auto, Daylight, Tungsten, Fluorescent
- Shutter speed controls auto 1/2000 sec to 16 seconds



Rent* \$10.07/wk (E3471)

\$899

Kodak CX4200 2.0 Mega Pixel

Get ready to shoot - and share

- 2.0 Mega Pixel
- 2x digital zoom
- 16MB internal memory expandable with MMC/SD memory card slot
- Auto picture rotation on camera, PC or TV



(F9631)

\$345

Kodak CX4230 2.0 Mega Pixel

EasyShare Zoom digital camera

- 2.0 Mega Pixel
- 6x zoom (3x optical, 2x digital)
- New: share button on camera
- Kodak colour science inside
- 16MB internal memory and MMC/SD card expansion
- Compatible with optional Kodak EasyShare camera dock



(F9796)

\$539

Kodak



PICTURE CARDS

32MB Picture Card

(62677) **\$57**

64MB Picture Card

(82249) **\$89**

128MB Picture Card (A5253)

\$159

Kodak



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15 sheets
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(D3258)

\$35

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AG neovo display

NEW

F-15

Rent* \$10.06/wk
(E0738)

\$898

F-17

Rent* \$16.79/wk
(F1316)

\$1,498



F-15/F-17

- 15"/17" TFT Active Matrix Screen
- XGA Display - 1024 x 768/SXGA 1280 x 1024 Resolution
- Ultra Slim & Lightweight
- Cable Management
- Total Flat Display

S-15V

- Neo-V Crystal Optic Filter
- 15" TFT Active Matrix Screen
- XGA Display - 1024 x 768 Resolution
- MVA - Wide Viewing Angle Technology
- Glass Panel/LCD Protection
- Total Flat Display
- Unique Foldable Small Footprint Stand
- Analogue & Video Inputs



S-15V

Rent* \$19.59/wk
(E0739)

\$1,748

TOUCH SCREEN

S-15T

Rent* \$32.73/wk
(E0740)

\$3,298



S-15T

- Elo Clear Glass Touch Screen with SAW Technology
- 15" TFT Active Matrix Screen
- MVA - Wide Viewing Angle Technology
- Total Flat Display
- XGA Display 1024 x 768 Resolution
- Unique Foldable Small Footprint Stand

S-18/S-19

- Neo-V Crystal Optic Filter
- 18"/19" TFT Active Matrix Screen
- SXGA Display - 1280 x 1024 Resolution
- Contrast Ratio: S-18 550:1, S-19 500:1
- MVA - Wide Viewing Angle Technology
- Glass Panel/LCD Protection
- Total Flat Display
- Analogue, Video & Digital Inputs



S-18

Rent* \$34.71/wk
(D7868)

\$3,498

S-19

Rent* \$37.82/wk
(E7793)

\$3,998

X-215/X-174

x-215

Rent* \$21.83/wk
(E7792)

\$1,948

X-174

Rent* \$29.75/wk
(E0742)

\$2,998



- Neo-V Crystal Optic Filter
- 15"/17.4" TFT Active Matrix Screen
- Display - XGA 1024 x 768/ SXGA 1280 x 1024 Resolution
- MVA - Wide Viewing Angle Technology
- Glass Panel/LCD Protection
- Total Flat Display
- Analogue, Video & Digital Inputs
- Metal Housing & Aluminium Stand

Wine on-line?



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New models out now!

Multisync LCD1760V

NEW

- 17" LCD Monitor
- Resolution 1280 x 1024
- Available in black or silver

Rent* \$11.75/wk (G8756)

\$1,049



Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
HARRIS TECHNOLOGY.
*Delivery charges extra.

NEC

V730
17" CRT
Monitor
1280 x 1024
(B7522)

\$239

V930
19" CRT Monitor
1600 x 1200
(C8739)

\$459



LCD1560V

- 15" LCD Monitor
- Resolution 1024 x 768
- Available in black or silver
- Available Feb 2003

Black Rent* \$7.16/wk

(G8753) **\$639**

Silver Rent* \$7.16/wk

(G8864) **\$639**



LCD1850E

- 18" LCD Monitor
- Resolution 1280 x 1024
- Available in black or white

Black Rent* \$18.59/wk

(E5196) **\$1,659**

White Rent* \$18.59/wk

(E1036) **\$1,659**



LCD1920NX

- 19" LCD Monitor
- Resolution 1280 x 1024
- Available in black or white

Black Rent* \$22.40/wk (F8689) **\$1,999**

White Rent* \$22.40/wk (F8688) **\$1,999**

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FE991SB

- 19" Flat CRT Monitor
- Resolution 1792 x 1344 @ 68Hz
- Flat aperture grille
- SuperBright function

Rent* \$9.62/wk (G8754) **\$859**



FP2141SB

- 22" Flat CRT Monitor
- Max resolution 2048 x 1536 @ 85Hz
- Flat aperture grille
- SuperBright function

Rent* \$16.57/wk (G8755) **\$1,479**



LT240

- XGA Resolution 1024 X 768
- 1600 ANSI Lumens
- Weighs 3.2kg

Rent* \$52.78/wk (G4304) **\$5,720**

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High-Breed Monitors

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Extend to a total of 3 Years Return to Base

Extend to a total of 5 Years Return to Base

Upgrade Return to Base of Warranty Extension to On-Site

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SyncMaster 171N 17" LCD Monitor

- 17" TFT computer monitor
- 1280 x 1024 max resolution
- 16.2 million colours
- 140/120 viewing angle (H / V)
- 350:1 contrast ratio
- Ultra slim bezel (13.5mm)

Silver Rent* \$13.21/wk (F9638)

\$1,179



SyncMaster 955DF 19" CRT Monitor

Graphix Pro Series Features:

- 18" viewable screen
- 0.20mm dot pitch (horizontal)
- 1600 x 1200 max resolution @ 68Hz
- DynaFlat - Infinitely flat tube
- Onscreen digital display
- Smart III surface treatment (anti-static & anti-glare)
- MPR-II/NUTEK certified
- Plug & play capability

(C3975) **\$549**



SyncMaster 753DFX 17" CRT Monitor

- 17"(16" Viewable)
- 0.20mm dot pitch (horizontal)
- 1280 x 1024 @ 66Hz Maximum resolution
- DynaFlat - Infinitely flat tube
- Smart III surface treatment (anti-static & anti-glare)
- On screen digital display
- Plug & play compatibility
- MPR-II/NUTEK certified

(C1283) **\$295**



SyncMaster 152S 15" LCD Monitor

- Ultra slim bezel
- 15" 1024 x 768 @ 75Hz Maximum resolution
- 16.2 million colours
- 330:1 Contrast ratio LCD monitor
- 0.297mm dot pitch
- On screen digital controls
- Wall mounting capability
- On screen digital display
- 3 year on-site warranty

Silver Rent* \$8.82/wk (G4526)

\$785



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Video Editing Hardware

PRO-ONE RTDV - THE PRO-ONE RTDV DEAL OF THE YEAR!

Pro-ONE RTDV

Real-Time Analogue or Digital capture and output
Broadcast quality
Real-Time effects
Real-Time fast and slow motion
Real-Time titles
Real-Time 3D effects
Hardware accelerated
MPEG-2 compression



\$1,995
(G3140)

BUY this...

GREAT BUNDLE!!

GET THIS... AND THIS... FREE!



Commotion 4.1



Hollywood FX Pro

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*Delivery charges apply

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DV500 DVD

Pinnacle DV500 DVD is the successor to Pinnacle Systems' popular DV500 real time DV editing solution that has a proven track record in stability, reliability and compatibility. Now it's even better with the addition of more real time features designed to streamline the DVD creation process. In addition to direct import of MPEG-2 files to the timeline, Pinnacle DV500 DVD has hardware accelerated MPEG-2 rendering to allow faster transfer of video. Pinnacle DV500 DVD is the only choice for high performance video editing.



\$1,329
(F0705)

NOW INCLUDES ADOBE PREMIERE 6.5

STUDIO DELUXE

Covert analogue to DV format & vice versa. Full analogue & DV editing solution! Dedicated breakout box for desktop connections. Includes analogue and digital capture card, full version of Studio 8 and Hollywood FX Plus. This is the ultimate home video solution.



"COMPLETE DVD EDITING AND CREATION PACKAGE".

\$849
(F9330)

STUDIO DC10 Plus

Studio DC10 Plus - dedicated solution for capturing & exporting your videos to analogue tapes (VHS, SVHS, Hi8 tapes, TV & Webcams). Includes analogue capture and output card and full version of Studio 8.



"COMPLETE DVD EDITING AND CREATION PACKAGE".

\$489
(F9329)

STUDIO DV

Includes IEEE 1394/Firewire Card with 3 ports (2 external, one internal) and full version of Studio 8.



"COMPLETE DVD EDITING AND CREATION PACKAGE".

\$349
(F9326)

STUDIO DVClip

The best starting point for DV editing. Looking for an easy, affordable way to edit your DV or digital movies? Look no further! Studio DVClip comes with a special version of Pinnacle's award winning Studio 8 software and because it's so stable and easy to use, it's the number one choice for beginners. Includes IEEE 1394 FireWire card, IEEE 1394 cable and Pinnacle Studio SE software.



\$149
(G1772)

PCTV

Watch TV on your PC! The Pinnacle PCTV allows you to watch and record TV on your PC. You can record MPEG-1 or MPEG-2 (depending on system speed) and then burn to DVD or CD.



\$125
(B0290)

PCTV Pro

Includes an FM radio tuner as well as stereo sound.



\$239
(F0462)

Web Direct

See Web Direct Link (at top of page) for more products and latest info!

Fly Buys

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*** SPECIAL Pro-ONE RTDV OFFER TERMS AND CONDITIONS.** Buy Pinnacle Pro-ONE RTDV between 01/11/02 and 28/02/03 and fill out our Pro-ONE RTDV Promotion coupon. Return completed coupon and dated sales receipt to the address on the coupon to receive one copy of Pinnacle Commotion 4.1 and HFX Pro Upgrade software. Your request must be postmarked by 28/02/03. Allow 6-8 weeks for delivery. Cannot be combined with any other promotional offer. Pinnacle Systems distributors and dealers may not participate in this offer. This coupon must accompany your request. Your sales receipt must be dated between November 1, 2002 - February 28, 2003. Limit one Commotion & HFX Pro per household. Request for Commotion & HFX Pro must be postmarked on or before February 28, 2003. Offer subject to availability. Void where prohibited. Offer valid in AUSTRALIA only.

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Sales: 1300 13 9999
Fax: 1300 13 6666
Web: www.ht.com.au
Email: sales@ht.com.au

HARRIS TECHNOLOGY Technology Centre
at Kmart Broadway-Sydney

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The future in imaging

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- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base of Warranty Extension to On-Site

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Magicolor 2300 DeskLaser

The InkJet Killer

A colour laser printer under \$2,000 without the killer inkjet running costs. Armed with high resolution, high capacity and high quality output this printer leaves nothing but a small footprint and carries a tiny cost of ownership.

Rent* \$21.28/wk (F7927) **\$1,899**

Print Speed	Up to 4ppm colour A4, 16ppm mono
Resolution	2400 x 600dpi
Interface	Ethernet (10/100BaseTX); USB 1.1; Parallel; optional Bluetooth
Compatibility	Windows 95/98/2000/NT/XP



PagePro 1200W

Desktop Monochrome Printing

To break away from the pack and take the lead, you need office equipment that enables you to do more with fewer resources. With a 3 year exchange warranty that includes the drum, the PagePro 1200W has amazing printing efficiency.

(F9324) **\$469**

Print Speed	Up to 12ppm
Resolution	1200 x 1200dpi
Interface	USB 1.1; IEEE 1284 Parallel
Compatibility	Windows 95/98/2000/NT/XP



PagePro 9100N

Networkable A4 & A3 monochrome laser printer

The PagePro 9100N represents the best value in A3 network printing! Even with print speeds of 35 pages per minute and free Ethernet interface, its price matches what you'd expect to pay for smaller, slower laser printers.

Rent* \$32.24/wk (E3659) **\$3,249**

Print Speed	35ppm A4, 19ppm A3, mono
Resolution	1200 x 1200dpi
Interface	USB 1.1; IEEE 1284 Parallel; 10/100BaseTX Ethernet
Compatibility	PostScript 3, PCL 6, PDF, HP-GL, PCL 5e



Magicolor 3100

16ppm A4 tandem colour laser printer

Finally there's a desktop colour laser printer for business that prints just as fast in colour as it does in black and white. The Magicolor 3100 delivers up to 16 pages per minute to get the job done. It also has automatic duplexing for two-sided printing.

Rent* \$41.61/wk (D9169) **\$4,398**

Print Speed	16ppm colour & mono
Resolution	1200 x 1200dpi
Interface	USB 1.1; 10/100 BaseTX Ethernet, IEEE 1284Parallel
Compatibility	PostScript 3, PCL6, PDF, HP-GL



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Xerox Award Winning Colour



• 16ppm

Image for illustration purposes only

• 4 configurations available

From

\$3,895

Rent* \$36.85/wk (F3977)

* optional on B and N models,
standard on DP and DX models

Xerox Phaser® 8200

The affordable Xerox Phaser® 8200 colour printer offers the most easy to use, flexible and environmentally friendly office colour printer platform. Producing consistently vibrant and stunning colour prints the 8200 is ideal for any office application from customer facing documents to internal reports and memos.

- Up to 16 full colour & mono ppm Industry-leading 9 second first-colour-page-out time
- Optimal productivity with a fast 300MHz PowerPC RISC Microprocessor
- Advanced ColourStix II solid ink technology is environmentally friendly and requires no printer cartridges
- Consistently brilliant 1200dpi colour quality on any paper*
- Legendary ease-of-use – as easy to re-load consumables as a stapler
- Intelligent Ready – no waiting for it to warm up

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*Delivery charges extra.

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• 16ppm

Image for illustration purposes only

• 4 configurations available

From

\$4,749

Rent* \$44.93/wk (F4374)

** optional on B model

Xerox Phaser® 6200

The Xerox Phaser® 6200 A4 colour laser printer prints high-resolution full-page colour at 16ppm in both colour and black and white. With stunning print quality of up to 2400dpi, the 6200 offers the print speed and performance ideally suited to the office environment.

- 16ppm in colour or black and white and up to 2400**dpi delivers both high performance and print quality at the same time
- 15 seconds first page out time
- Printer management/control and set-up is intuitive for new users while providing the advanced features network administrators require
- High duty cycle of up to 60,000 pages per month

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Technology Centre at
Officeworks
Chadstone - VIC
Technology Centre Shopped Not all products are in-store, but consulting & advice available on all items.



• 22ppm

Image for illustration purposes only

• 3 configurations available

From

\$15,899

Rent* \$128.88/wk (D5185)

Xerox Phaser® 7700

The Xerox Phaser® 7700 single-pass A4/A3 colour laser printer combines exceptional colour quality with the phenomenal speed of 22ppm for both colour and black and white. The 1200dpi print quality and automatic colour-calibration provides consistent colour imaging every time. Outstanding media flexibility allows for A3 with full bleed and standard automatic 2-sided printing, with an optional finisher/stacker to meet any printing requirements.

- 22ppm colour and black and white printing
- Standard 1200dpi resolution with photo mode
- Automatic 2-sided printing as standard
- High performance 500MHz G4 class processor
- 128MB memory (up to 512MB) and 5GB internal hard disk drive
- PhaserMatch ICC 7700 colour matching tool, auto-install print drive installation and CentreWare IS/Web Printer Management S/W

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hp LaserJet & Business InkJet Printers

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hp LaserJet 1000 USB



Rent*\$6.55/wk (C9361)

\$585

hp LaserJet 1200 Series



1200
Rent*\$8.79/wk (B9799)

\$785

1220
scan/copy
Rent*\$10.36/wk (B9968)

\$925

1200n 16MB
Rent*\$14.51/wk (B9958)

\$1,295

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hp Color LaserJet 5500 Series

High-speed A3 colour at an affordable Price

- Up to 22ppm mono and colour
- Inline technology allows outstanding print speed and quality
- 600dpi with imageREt 2400
- Enhanced ease of use
- 400MHz processor
- 600 sheet input tray
- 96MB printer memory
- 2 year onsite warranty
- 120,000 pages per month duty cycle.

NEW!



hp LaserJet 5500 Rent*\$66.74/wk (G4248) **\$7,498**

hp LaserJet 5500dn Rent*\$75.29/wk (G4249) **\$8,459**

hp LaserJet 5500dtn Rent*\$86.61/wk (G4250) **\$11,055**

hp LaserJet 2200 Series

hp LaserJet 2200 Series is a range of entry-level workgroup laser printers that delivers reliable and professional laser print quality at 18ppm with resolution up to 1200 x 1200 dpi at full speed.

Adaptable and versatile, the hp LaserJet 2200 series has multiple connectivity options, 3 DIMM slots and versatile paper-handling capabilities.



hp LaserJet 2200 Rent*\$16.53/wk (D0869) **\$1,475**

hp LaserJet 2200d Rent*\$17.22/wk (B9956) **\$1,537**

hp LaserJet 2200dn Rent*\$22.92/wk (B9957) **\$2,045**

hp LaserJet 2200dtn Rent*\$26.09/wk (B9898) **\$2,629**

hp Color LaserJet 2500 Series

- 16ppm black, 4ppm colour
- Very quiet when operating
- 125 sheet MP tray & 250 sheet cassette (2500 & 2500N Models)
- 125 sheet face down output (250 & 500 paper trays available)
- Straight thru paper slot for thick media
- ImageREt 2400
- 64MB RAM (all configurations) expandable 256MB.



hp LaserJet 2500L (Lite Version)

Rent*\$23.39/wk (G0177) **\$2,357**

hp LaserJet 2500 (Base Unit)

Rent*\$28.21/wk (F6656) **\$2,843**

hp LaserJet 2500n (Networked)

Rent*\$33.38/wk (F9812) **\$3,364**

hp LaserJet 4100 Series

- Super fast printing at 24ppm A4 print
- 250MHz processor ensures quicker return to application
- complex documents print faster with 16MB/32MB memory
- 12 second first page out
- HP Pro-Res & FastRes 1200dpi print quality at full speed
- dynamic RIP-once for faster processing of multiple original prints
- duty cycle of 150,000 pages/month.



hp LaserJet 4100 Rent*\$21.72/wk (B8399) **\$1,938**

hp LaserJet 4100n Rent*\$25.29/wk (B8400) **\$2,549**

hp LaserJet 4100tn Rent*\$29.73/wk (B8401) **\$2,990**

hp LaserJet 4100dtn Rent*\$34.28/wk (B8402) **\$3,450**

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Web
Direct

www.ht.com.au/cat/hp

hp LaserJet & Business InkJet Printers

hp LaserJet 4300 Series

- A4 size 43ppm
- 1200 dpi print quality
- 64MB RAM
- 350MHz processor
- two optional EIO interface slots

- 500 sheet input tray (media capacity 600 sheets)
- 50 sheet face up output tray
- 250 sheet face down output tray
- 100 sheet multipurpose input tray.

hp LaserJet 4300	Rent* \$25.89/wk (G4258)	\$2,609
hp LaserJet 4300N	Rent* \$32.91/wk (G4259)	\$3,316
hp LaserJet 4300TN	Rent* \$37.44/wk (G4260)	\$3,773
hp LaserJet 4300DTN	Rent* \$40.51/wk (G4261)	\$4,282



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hp LaserJet 4100mfp Series

- Print, copy & colour scan in one machine. The multi-function printer saves costs and office space
- Prints at 24ppm (A4)
- The 250MHz processor, 64MB RAM and 5.1GB hard disk enable fast processing of large files and print jobs
- Scan resolution up to 600 ppi
- HP print cartridge and software work hand-in-hand to allow users to monitor and order supplies, hence ensuring uninterrupted printing, consistent output quality and efficient workflow.



hp LaserJet 4100mfp Rent* \$44.37/wk (E3829) **\$4,690**

hp LaserJet 4200 Series

- A4 size 33ppm
- 1200 dpi print quality
- two flexible EIO interface slots
- 100 sheet multipurpose input tray
- 500 sheet input tray
- 50 sheet face up output tray.
- Options:**
 - auto duplex unit
 - hp jetdirect 615n fast ethernet internal EIO print server
 - additional RAM (up to 416MB)
 - 75 sheet envelope feeder
 - 500 sheet stacker
 - 500 sheet stapler/stacker.



hp LaserJet 4200	Rent* \$23.94/wk (G4255)	\$2,136
hp LaserJet 4200n	Rent* \$28.23/wk (G4256)	\$2,845
hp LaserJet 4200tn	Rent* \$32.64/wk (G4257)	\$3,289

hp LaserJet 3300 & 3330mfp

- 90MHz
- 32MB RAM
- Up to 14 ppm (A4 size)
- Compact size to save office space
- Optional high capacity cartridge print up to 3,500 pages
- Duty cycle of 10,000 pages per month
- Digital copying 14cpm, 600 x 600dpi
- Flatbed scanner: up to 216 x 381, 600ppi colour
- One year warranty



hp LaserJet 3300	digital print-copy-scan	Rent* \$11.18/wk (E3828)	\$998
hp LaserJet 3330mfp	print-fax-copy-scan	Rent* \$14.96/wk (E3864)	\$1,335

hp Business InkJet 3000 Series

- 21ppm black, 18ppm colour
- hp PhotoRET 3
- up to 2400 x 1200dpi
- USB/parallel/2 eio slots
- LCD control panel
- duplex printing (std on 3000dtn)
- PostScript® 3 emulation.



hp Business InkJet 3000	Rent* \$19.60/wk (G4251)	\$1,749
hp Business InkJet 3000n	Rent* \$23.77/wk (G4252)	\$2,395
hp Business inkJet 3000dtn	Rent* \$27.47/wk (G4253)	\$2,768

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hp scanjets and consumables

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hp scanjet 2300C

Easy One Touch Scan and
Copy Front Panel Buttons



- Up to 600dpi optical resolution
- 48bit colour
- Speedy previews in as little as 14 secs
- 10 - 2000% scaling
- Windows 98, 2000, Me, XP
- USB 1.1 and 2.0
- CCD Scan Technology allows you to scan 3-D objects - scan a flower as easily as a magazine.

(F4233) **\$155**

hp scanjet 3570C

HP's Photo-Quality Dual Sensor CCD
Technology Scanner with HP
Memories Disc Creator Software



- Up to 1200dpi optical resolution
- 48bit colour
- USB
- Scan 35mm negatives and slides with built-in adapter
- 10-2000% scaling in 1% increments
- Windows 98, 2000, Me, XP; PII, Celeron or compatible
- Photo-quality results for everything you scan
- Easy one-touch scanning, copying and emailing
- Hemera Jigsaw puzzler & CD designs creator for Windows.

(F4313) **\$325**

ink cartridges



No 29 Black Inkjet Cartridge
(21919) **\$69**

No 45 Black Inkjet Cartridge
(22643) **\$69**

No 78 Tri Colour Inkjet Cartridge Large
(97335) **\$139**

toner



hp c4092a LaserJet print
Cartridge for HP LaserJet 1100, 3200,
2500 page toner
(70459) **\$129**

hp 92298a LaserJet Black Print
Cartridge for LJ 4/M/+M/+5/5M/5N
6800 page Toner
(07995) **\$195**

hp 92298x LaserJet Black Print
Cartridge for LJ 4/M/+M/+5/5M/5N
8800 Page Toner
(42504) **\$209**

paper



hp c7006a hp photo quality,
semi-gloss, A4, 25 sheets
(C6840) **\$12**

hp q1936a hp premium inkjet
paper, A4, 200 sheets
(D9329) **\$38**

hp c7014a hp colorfast photo
paper T3, A4, 20 sheets
(C6528) **\$52**

hp deskjets & multifunction printers

hp deskjet 6122

- High speed colour printer perfect for the small to medium business • Up to 4800 x 1200 dpi in colour and 600 x 600 dpi in black
- Prints up to 20ppm in black and 13ppm in colour • 8 MB built-in memory
- USB 2.0 and parallel interface • 150 sheet input tray
- Automatic 2 sided printing • Low ink indicator light.



(G2451) **\$459**

hp deskjet 3820

- Photo-quality with HP PhotoREt 3 colour layering technology
- Up to 4800 x 1200 optimised dpi in colour (on hp colourfast photo paper & 1200 x 1200 input dpi) and rich black text
- Specially formulated hp fade-resistant inks and photo papers • One-touch print cancel button • Low-ink indicator light • Prints up to 12ppm in black and 10ppm in colour
- Networkable with optional hp jetdirect wired and wireless print servers.



(F7709) **\$189**

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*Delivery charges extra.

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Kwiktron's vast inventory of the latest equipment is in-stock and ready for immediate delivery.

02 9774 8666

hp deskjet 5550

- Get best photo-quality with HP PhotoREt 3 colour layering technology • Up to 4800 x 1200 optimised dpi in colour (on hp colourfast photo paper & 1200 x 1200 input dpi) and rich black text
- Optional 6-ink colour printing with hp PhotoREt 4 colour layering technology • Prints up to 17ppm in black and 12ppm in colour • Networkable with optional hp jetdirect wired and wireless print servers • Borderless 4" x 6" photo printing on hp colourfast photo paper • Ink backup printing mode • Automatic paper type sensor.



(F7710) **\$275**

hp D145

Colour All-In-One with high-speed printing and copying

- Print up to 1200 x 1200 dpi on hp premium photo paper • Print photos directly from your digital camera's memory card (CompactFlash, SmartMedia, Sony Memory Stick) with hp's photo proof sheet technology - with or without a PC
- Get fast printing at up to 19ppm in black, up to 16.8ppm in colour • Copies up to 18ppm in black and up to 16ppm in colour • Fast colour faxing with a 33.6Kbps modem • One-touch key pads, speed dials and other fax functions.



Rent* \$12.30/wk (E7707) **\$1,098**

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- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base of Warranty Extension to On-Site

hp psc 2110

All-In-One integration

- The simple-to-use HP psc 2110 all-in-one prints, scans and copies - all in colour • up to 4800 optimized dpi colour
- All colour print, scan and copy from one compact product with easy-to-use functions designed to make home projects fun and easy • Compact design saves space • High-quality scanning - great results with 600 x 1200 dpi resolution
- Share photos or text easily by scanning directly to e-mail attachments.



(G0815) **\$459**

hp psc 2210

Print, Scan, Copy and Fax

- USB connection
- 1200 x 2400 dpi optical scan resolution • 300 x 300 dpi fax resolution
- Prints up to 17ppm in black and 12ppm in colour
- Copies up to 17cpm in black and 12cpm in colour
- 33.6Kbps fax speed
- Flatbed scanner • Max scan size 21.59cm x 29.7cm • hp thermal inkjet print technology.



* Print speed may vary dependant on system: configuration and document complexity

Rent* \$6.71/wk (G1633) **\$599**

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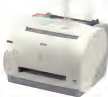
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Laser Printers....

1120 Laser Printer

NEW



- 600 x 600 (max 2400 x 600 dpi with A.I.R.)
- 10 ppm A4 size
- 125 sheet holder
- Letter, legal A4,

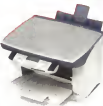
B5, transparency film, labels, envelopes, index cards

(G4580) **\$459**

ImageCLASS MPC 200

NEW

- 3-in-1 flatbed
- Print, copy, scan, memory card printing
- Up to 14 pages per min (mono)
- Up to 10 pages per min (colour).
- 600 x 1200 dpi



(G4582) **\$468**

ImageCLASS MPC 600F

- 5-in-1 flatbed (print, fax, copy, scan, PC fax)
- Up to 17 ppm (mono)
- Up to 12 ppm (colour)
- 2400x1200 dpi



Rent* \$9.48/wk (F4136) **\$846**

Canon

Inkjets....

S100SP Bubble Jet Printer

- High speed printing, up to 5ppm black text and up to 2ppm colour
- USB interface for Windows®
- Dual ink drop sizes for fine printing
- 720 x 360dpi



(E4209) **\$99**

i320 Bubble Jet Printer

NEW



- Up to 2400 x 1200dpi
- Up to 10ppm black
- Up to 7ppm colour
- Borderless 6" x 4" photo prints
- Advanced microfine technology to deliver microscopic 5pl ink drops

(G4584) **\$159**

S330 Bubble Jet Printer

- Up to 14ppm black and white and 10ppm colour printing
- Full bleed photo print
- Up to 2400 x 1200dpi resolution
- USB interface for Windows®
- Colour lasts up to 25 years using Canon's photo paper pro



(G2318) **\$209**

S520 Bubble Jet Printer

- Prints up to 14ppm black and white and 9ppm colour
- Up to 2400 x 1200dpi print resolution
- Colour lasts up to 25 years using Canon's photo paper pro
- Connect to USB or parallel
- Replace all four ink tanks individually



(E1136) **\$349**

Canon

Scanners....

N640P ex Flatbed Scanner



- Optical resolution of 600 x 1200dpi.
- 42-bit input
- Only 4cm tall
- Parallel interface
- Scans up to A4 size (quiet operation).
- Complete software package, LIDE Technology

(D4026) **\$125**

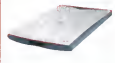
LiDE20 Flatbed Scanner



- One touch scan, copy and email
- USB interface
- 600 x 1200 dpi
- 48-bit input
- 24-bit output

(F9858) **\$165**

N1240U Flatbed Scanner



- Amazing 1200 x 2400dpi optical with selectable resolution up to 9600dpi
- Stylish charcoal and aluminium finish
- New Z-lid for scanning thick books etc
- Software included: OmniPage and Photoshop Elements

(C7589) **\$185**

D1250U2 /D1250U2F Flatbed Scanner



- High Speed At The Right Price
- 1200 x 2400 dpi optical resolution
- USB 2.0 for faster scanning
- Easy one touch control
- Software included: ArcSoft PhotoBase and Omnipage Pro 9.0

(E1246) **\$219**

• with 35mm Film Scanning (E1230) **\$299**

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NEW

EPSON STYLUS PHOTO 915

- 5760 optimised dpi using RPM technology
- 4 picolitre Micro Dots, for extremely fine print detail
- EPSON Intelligent ink system • True Border-free edge-to-edge printing on cut sheet or roll paper • Roll paper holder included
- Over 25 years lightfastness using EPSON ColorLife paper • Optional LCD Preview Monitor.



(G3333) **\$449**

NEW

EPSON STYLUS PHOTO 925

- 5760 optimised dpi using RPM technology
- 4 picolitre Micro Dots, for extremely fine print detail
- EPSON Intelligent ink system • True Border-free edge-to-edge printing on cut sheet or roll paper
- Roll paper holder and auto-cutter
- Over 25 years lightfastness using EPSON ColorLife paper • Multiple card slots.



Rent* \$8.95/wk (G2351) **\$799**

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EPSON STYLUS C61

- Crisp text, vibrant colours coupled with speed and reliability • Up to 14ppm black text A4 (memo) printing • 5760 x 720 optimised dpi using RPM technology
- USB and Parallel enabled.

(F8180) **\$214**



EPSON STYLUS C41UX

- Up to 12ppm black text printing (at economy mode) • Up to 1440dpi photo quality printing resolution • USB-enabled and complete with cable • Intelligent ink system • Fast, easy set-up and operation.

(F0853) **\$119**



EPSON STYLUS PHOTO2100

- Up to 2880 x 1440 dpi • 7 colour individual ink system with a new light black and either photo or matte black • A3+ • Epson Intelligent ink system • True Border-free printing
- Roll paper printer and auto cutter • 75yrs lightfastness • Up to 1.3mm thick media support.

Rent* \$20.16/wk (F2969) **\$1,799**



EPSON STYLUS PHOTO1290S

- A3+ • 6 colour photo printing • Border-free edge-to-edge printing • Max res 2880 x 720dpi with variable sized droplet technology • Over 25 years lightfastness prints • Features print image matching technology • On demand inkjet (piezoelectric) • Black text 9.4ppm (economy) • Text & photo 3.0ppm (normal) • Full page colour 1.3ppm (normal).

Rent* \$11.08/wk (G4593) **\$989**



EPSON STYLUS PHOTO 830

- 6-colour ink system • Up to 14ppm black text printing
- A4 economy • 5760 optimised dpi using RPM technology for true photo quality
- MicroPiezo print head technology
- Incredible fine 4 picolitre ink droplets
- True Border-free printing • USB and parallel interface • Over 25 years lightfastness.

(G2192) **\$329**



EPSON ALC4000

- Up to 16ppm in full-colour • Less than 30 seconds warm up time • True 1200dpi, with AcuLaser 2400dpi Class RIT • 192MB, expandable to 1,024MB • Networking and duplexing standard • Large paper capacity with versatile paper handling • Advanced job management including confidential job printing (requires optional hard drive).

Rent* \$46.55/wk (F3409) **\$5,045**

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EPSON EPL-5900

- 1200dpi
- True 1200dpi resolution
- 200MHz RISC processor
- USB & IEEE1284 parallel interface
- 8MB memory – expandable up to 16MB



Standard 250 sheet multi purpose tray & optional 500-sheet lower paper cassette unit.

Rent* \$6.70/wk (E5160) **\$598**

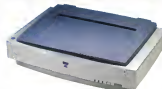
EPSON EPL-5900L

- The class leading desktop laser printer. Fast durable and high quality for the value conscious home and small office
- Superior print quality
- Fast 12ppm
- 1200dpi class resolution.



(E5318) **\$415**

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The Expression 1640XL A3+ scanner features EPSON's most advanced scanning technologies providing high speed, maximum detail and superior sharpness and clarity.

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The affordable laser printer for users with demanding print needs



Lexmark E210

- 12 pages per minute
- 600 x 600 dpi image quality
- 66MHz RISC processor
- 4MB RAM standard
- Windows and Linux support
- Parallel and USB standard
- 1 year LexExpress warranty

(D5338) **\$415**

The fast and reliable laser printer for users with demanding print needs



Lexmark E322

- 16 pages per minute
- 1200 dpi image quality
- 133MHz RISC processor
- 8MB RAM standard
- PS L2 and PCL 6 standard
- Parallel and USB standard
- Dual input trays, 1 x 150 and 1 x 250 sheet
- 2 years LexExpress warranty

Rent* \$8.39/wk (D5341) **\$749**

The high performance compact network ready printer with advanced paper handling



Lexmark E322N

- Integrated ethernet 10/100BaseTx and USB
- 16 pages per minute
- 1200 dpi image quality
- 133MHz RISC processor
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- PS L2 and PCL 6 standard
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- 2 years LexExpress warranty

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AutoCAD® 2002 (C7859)



Autodesk Architectural Desktop 3.3 (C9723)



Autodesk VIZ 4 (E1066)



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Autodesk VIZ 4

Bring your designs alive with Autodesk VIZ 4, a multimedia software tool that provides a visually rich, 3D, interactive user interface. Autodesk VIZ 4 is easy to use & is interoperable with AutoCAD® applications. Upgrades also available.

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Volo™ View 2

Volo™ View 2 software is a cost-effective, easy-to-use, digital design viewing solution that lets everyone on your team electronically review, mark up, measure, and plot AutoCAD® and Autodesk Inventor™ based drawings. Upgrades also available.

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(D5996) **\$142**



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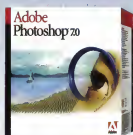


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This professional image-editing standard software helps you work more efficiently, explore new creative options and produce the highest quality images for print, the web and anywhere else. Create exceptional imagery with easier access to file data, streamlined web design and faster professional quality photo retouching.



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InDesign Crossgrade
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NEW
Delivering unmatched hardware support, Adobe Premiere 6.5 software is the most adaptable DV editing tool on the market today. Now you can work more productively with real-time editing capabilities, and you can take advantage of the sophisticated new Adobe Title Designer, MPEG-2 export, DVD authoring, powerful audio tools and more to create extraordinary video productions.



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Design, develop and maintain a powerful Web presence!

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Adobe

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Contains the following leading edge design and publishing applications in one fully integrated suite • InDesign 2.0 • Photoshop 7.0 • Illustrator 10.0

* Acrobat 5.0. Together these programs give you everything you need to create & produce professional images, illustrations & layouts and to publish documents across media.

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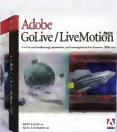
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(E066)



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Desktop AV Protection	✓	✓	✓	✓
Network Server Protection	✓	✓	✓	✓
Administrative Settings	✓	✓	✓	✓
Management Console	✓	✓	✓	✓
1 Year Upgrade Insurance	✓	✓	✓	✓
1 Year Technical Support	✓	✓	✓	✓
Desktop Firewall Protection				✓
Intrusion Detection				✓
MS Exchange Mail Server Protection		✓	✓	
Gateway AV Protection			✓	
Lotus Domino Mail Server Protection			✓	
5 User	(G0215) \$645	(G0218) \$809	(G4537) \$1,109	(G1129) \$1,265
10 User	(G0216) \$1,135	(G0219) \$1,405	(G4536) \$1,955	(G1130) \$2,225

Symantec Firewall/VPN Appliance (Models 100, 200, 200R)

Easy-to-Use, All-in-One Appliance comes in three models to meet varying network traffic and remote access requirements, with no per-user licensing requirements. Installs quickly and easily, offering small offices a turnkey solution for securing outbound and inbound Web, email, FTP traffic and more.



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(5 ports)—Provides plug and play networking, web access and firewall and VPN security for up to 25 users*.

Rent* \$10.41/wk (E0950) **\$929**

• Symantec Firewall/VPN Model 200

(10 ports)—Brings firewall and VPN protection, load-balancing and high availability to offices with up to 40 users*.

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- Norton Utilities™
- Norton CleanSweep™

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Norton Personal™ Firewall 2003 keeps hackers out and personal data in. Secure your PC today with Norton Personal™ Firewall, your maximum defence against hackers and privacy threats.

 (G0282) **\$82**

Norton AntiVirus™ 2003



Symantec's Norton AntiVirus™ 2003 is the world's most trusted antivirus solution. Now this easy-to-use program scans and cleans instant-message attachments as well as email messages. It removes viruses automatically, without interrupting your work. Automatic updates help defend your PC against new viruses. Automatically detects and blocks worms in outgoing email messages, stopping them from sending themselves out to others.

 (F9859) **\$89**
**NEW
Version**

Norton Ghost™ 2003



Symantec's Norton Ghost™ 2003 protects your data from computer disasters. The intuitive Windows® interface makes it easy to create regular backups of your hard drive. You don't even need to make a boot disk. File restoration is simple from the comprehensive disk image.

 (F9865) **\$135**

Norton pcAnywhere™ V10.5



Symantec's pcAnywhere™ is the world's leading remote control software. Encryption and authentication ensure secure access to remote computers. pcAnywhere™ also works with cable & DSL modems for faster remote connections.

 Host & Remote (D8088) **\$239**

 V10.5 / 5 User (D5935) **\$479**

Norton SystemWorks™ 2003 Pro



Symantec's Norton SystemWorks™ 2003 Professional Edition provides advanced problem-solving solutions to maximise PC performance, includes full version of Norton Ghost™ 2003.

Includes:

- Norton AntiVirus™ 2003
- Norton Utilities™
- Norton CleanSweep™
- Norton Ghost™ 2003

 (F9863) **\$169**

Norton Internet Security™ Standard



Symantec's Norton Internet Security™ 2003 provides essential protection from viruses, hackers, and privacy threats.

Includes:

- Norton AntiVirus™
- Norton™ Personal Firewall
- Norton™ Spam Alert
- Norton™ Parental Control

 (G0279) **\$122**

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CONTRIBUTE

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NEW

FULL VERSION (G4726) **\$239**

STUDIO MX

The Essential Suite of Tools for Building Rich Internet Applications

Macromedia Studio MX is the integrated suite of easy, powerful, and open development tools for creating rich internet applications that can be delivered across major platforms and devices. It includes Macromedia Flash MX, Dreamweaver MX, Fireworks MX, FreeHand, ColdFusion MX Server Developer Edition and Macromedia Flash Player 6. Macromedia Studio MX provides the essential tools for creating everything from static websites to rich internet applications. The suite supports each stage of the web production process, including creating graphics, laying out HTML pages, coding application logic, building user interfaces and assembling complete solutions.



FULL VERSION (E9963) **\$2,190**

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Professional web development solution!

An easy, powerful and open authoring tool. For the first time designers, developers and programmers can work within one environment to easily create and manage any professional website, whether it's built using HTML, XHTML, XML, web services, ColdFusion, ASP.NET, ASP, JSP or PHP.



UPGRADE (F0141) **\$429**

FULL VERSION (F0137) **\$849**

FLASH MX

The Standard for High Impact Web Content and Applications

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UPGRADE from V4.5/5.0 (E4828) **\$425**

FULL VERSION (E4014) **\$999**

COLDFUSION MX

Easily assemble powerful solutions. Rapid server-scripting environment for creating rich Internet applications.

Combining highly approachable scripting, effortless connectivity to enterprise data and powerful built-in search and charting capabilities, lets developers easily build and deploy dynamic websites, content publishing systems, self-service applications, commerce sites and more. Supports Windows®, Linux and UNIX operating systems.



UPGRADE from V4.5/5.0 PRO (F0368) **\$987**

FULL VERSION PRO (F0364) **\$1,445**

FIREWORKS MX

The best solution for Web graphics!

The easiest way to create, optimise and export interactive graphics in a single, web-centric environment. Includes the tools to be used by every person responsible for creating web graphics, from the HTML developer to the design expert. Delivers a streamlined environment for creating everything from simple graphical buttons to sophisticated rollover effects and pop-up menus.



UPGRADE (F0337) **\$319**

FULL VERSION (F0193) **\$639**

DIRECTOR MX

Combine any media, deliver anywhere and reach everyone. Director MX is the multimedia-authoring solution for building rich accessible content deployed on CD/DVD, kiosks and the web.



UPGRADE from 8.x (G7803) **\$868**

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The MYOB Family - helping more Australians to mind their own business

The MYOB Family offers a choice of four accounting products each designed for the needs of Australian small businesses. In addition we provide specialised products for payroll, point of sale and asset management.

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BusinessBasics brings all of your basic business functions together in one easy-to-understand application. MYOB BusinessBasics simplifies the way you quote, track and invoice your jobs, simultaneously tracking your transactions and GST, and providing you with over 70 reports and graphs to help you understand your business.

(G4153)

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MYOB Accounting is for businesses that need to streamline procedures and would benefit from improved inventory management, better management of customer and supplier relationships, and advanced business reporting.

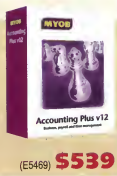


(E5468)

\$389

Accounting Plus V12

Business, payroll and time management for employers. MYOB accounting plus is for businesses that need to streamline accounts procedures and would benefit from improved inventory management.



(E5469)

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Premier Account V6

MYOB Premier is for businesses that need to streamline accounts procedures. Whether through simplifying complex inventory issues running an automated payroll, time billing, accessing advanced reporting or increasing productivity with multi user access.



(E5472)

\$1,089

Pocket Accounts

MYOB Pocket Accounts runs on a Palm OS device and links seamlessly with MYOB Accounting software on the desktop. Allowing users to synchronise their entire day's data at the push of a button.



(C5815)

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Retail Manager V6

Retail point of sale management for retailers. MYOB Retail Manager, replaces the cash register with a point of sale system that streamlines store operations, manages sales, stock, GST, staff and customers and procedures critical reports across a wide range of business activities.



(G0172)

\$1,869

Retail Manager Professional V1.0

MYOB RetailManager Professional adds bulk pricing adjustment and the ability to connect with a range of time-saving peripheral devices to the point-of-sale and retail business management functionality of MYOB RetailManager Standard.



(G0173)

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Special Offer

Purchase a FileMaker Pro 6, 5-user pack together with FileMaker Server and not only do you benefit from great pricing, you also qualify for all future purchases at a Volume License Agreement rate!

*Promotion ends 28 March 2003

(G4325)

\$3,498

FileMaker Pro 6

FileMaker Pro 6 enables you to easily organise and track people, projects, images and information. Workgroups can quickly share content over a cross-platform network or their intranet via a web browser. New to version 6 is support for XML, extending the reach of FileMaker Pro to a virtually limitless number of other applications. Also includes 21 new and updated templates for instant productivity.

Upgrade

(F4327) **\$269**

Full Version

(F4326) **\$565**



FileMaker Pro 6 Unlimited

FileMaker Pro 6 Unlimited enables powerful internet and intranet web database publishing which brings expanded productivity to the workgroup, helping you manage and share important information over your intranet or the internet. Use the FileMaker Web Server Connector to increase the performance, reliability and scalability of your FileMaker Web databases.

Full Version

(F4323) **\$2,179**



FileMaker Developer 6

FileMaker Developer 6 enables you to design stand-alone runtime solutions which take advantage of the powerful new features in FileMaker Pro 6. Features like digital image import, customisable dialogue boxes, and XML import and export. Enhancements to FileMaker Developer 6 include updated versions of the Script debugger, database design report and developer tool.

Full Version

(F5578) **\$1,095**



FileMaker Server

FileMaker Server is the best way to deploy your FileMaker Pro 5, 5.5 and 6 solutions. Running on Windows® and Red Hat® Linux, it features an easy-to-use relational database server supporting up to 250 concurrent guests and 125 hosted files.

It includes centralised backups, remote administration, LDAP directory support and automatic updates of plug-ins for guests.

Upgrade

(E0881) **\$1,089**

Full Version

(C7741) **\$2,099**



FileMaker Mobile 2.1

For Pocket PC and Palm OS! FileMaker Mobile 2.1 lets you easily synchronise information between local FileMaker Pro 5.5 v2 and 6 databases and a handheld device. New version 2.1 adds compatibility with bar code scanning devices on Pocket PC and HandSpring Visor (Palm OS) handhelds using the symbol barcode. Leverage the power of the desktop and benefit from the portability of the handheld. Modify, sort, add and delete records wherever you go!

Full Version

(G2248) **\$85**



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With a Volume License Agreement (VLA), you qualify for licensing pricing on all products licensed, regardless of the quantity. Or, make it even easier and license all FileMaker products for an entire site of at least 50 seats with FileMaker Box Set. Education facilities are entitled to even greater discounts. Call one of our licensing specialists to discuss the many advantages of purchasing FileMaker licensing.

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Great reporting
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QuickBooks**2002 Small Business**

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QuickBooks**2002 Small Business Plus**

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(F3008) \$185	Full Version (E5331) \$379	Full Version (E5333) \$515	Full Version (E5334) \$1,065
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Subscription (E5351) \$185	Subscription (E5352) \$229	Subscription (E5353) \$445	

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PC-cillin 2003 - New

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NEW

Full Version (G4518) **\$79**

5 User Licence (G4519) **\$233**

Enhanced Antivirus Scanning

Guards against known harmful script-based viruses and also from new unknown viruses.

Advanced Heuristic Technology

PC-cillin 2003 integrates the increased ability to detect unknown viruses using advanced heuristic technology. Unlike other antivirus software that only offers general heuristics,

PC-cillin 2003 provides a customised heuristic scan to target specific virus file types. This makes detection more precise and powerful. Best of all, this technology is integrated with the scan engine and works automatically every time a scan is performed.

Outbreak Alert: Trend Micro PC-cillin 2003 offers an industry-first, advance warning service: before a serious virus outbreak can strike, you have time to immediately update PC-cillin and protect your computer from infection, no matter when your next auto update is scheduled.

Email Scan: PC-cillin can scan messages and attachments retrieved from POP3 mail servers and attachments from Webmail servers (email that is stored on a server and accessed by a Web browser).

Enhanced Personal Firewall: Built from the ground up, PC-cillin's enhanced Personal Firewall provides solid protection to help prevent intrusion attempts from unauthorised users while you are connected to the Internet. The PC-cillin Personal Firewall is a stateful packet inspection firewall. Unlike packet filter firewalls, stateful packet inspection firewalls not only examine the headers of a packet, but also the contents.

WebTrap: PC-cillin 2003 WebTrap™ has been enhanced to minimise any decrease in speed while viewing Web pages. Now PC-cillin offers solid protection from malicious scripts without causing any significant decrease in Web viewing time.

Integrated Wireless Security: Protect important information on your PDA and secure your PC during synchronisation, an extensive solution for the Internet and wireless era.

Wi-Fi Protection

With PC-cillin, you can quickly secure your wireless Ethernet access points with a click. This protects your computer when you are roaming in an un-trusted area.

- Automatically scans for scripting viruses based on 'what they do' rather than how they are written.
- Compatible with Microsoft® Windows® 98, ME, NT, 2000 and XP
- 12 months FREE, fast, automatic on-line virus pattern updates.
- Includes a Personal Firewall for secure Internet computing.
- Will detect and clean both boot and file viruses, protect against malicious Java applets, ActiveX and web scripts.



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(C9884)

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PROFESSIONAL

UPGRADE (C9885)

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- I want to enjoy the best in digital music.
- I would like to experience personal entertainment and gaming.
- I would like increased security & faster Internet access.

HOME EDITION

(C9882)

\$405

HOME EDITION

UPGRADE (C9883)

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Microsoft Windows 2000 Server is the easy way to Internet-enable your business and is designed to meet the needs for businesses of all sizes, from small, centralised organisations to the largest distributed enterprise. Windows 2000 Server integrates standards-based directory, Web, application, network, file and print services with powerful end-to-end management and reliability to provide the best foundation for integrating your business with the Internet.



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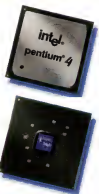
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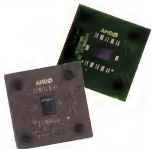
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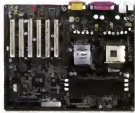
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KF45A Midi Tower

- 3 x External 5.25" Bays
- 2 x External 3.5" Bays
- 1 x Internal 3.5" Bays
- Power Supply: 250W ATX
- Smart slide-in back bracket with no screws needed
- W: 194mm
- D: 440mm
- H: 426mm



\$75

QF45A Midi Tower

- 3 x External 5.25" Bays
- 2 x External 3.5" Bays
- 1 x Internal 3.5" Bays
- Power Supply: 250W ATX
- Front USB & Audio
- Smart slide-in back bracket with no screws needed
- W: 194mm
- D: 440mm
- H: 426mm



\$95

QF50C Midi Tower

- 4 x External 5.25" Bays
- 2 x External 3.5" Bays
- 1 x Internal 3.5" Bays
- Power Supply: 300W ATX
- Front USB & Audio
- Smart slide-in back bracket with no screws needed
- W: 194mm
- D: 440mm
- H: 426mm



\$125

H800 Server

- 9 x External 5.25" Bays
- 1 x External 3.5" Bay
- High quality 1mm thick steel
- Power Supply: Redundant 350W
- Air Flows with Rear DC Fan & Dust Filter Support
- Optional hot swappable 3 HDD cage
- One key lock all parts
- W: 220mm
- D: 590mm
- H: 451mm



\$595

H700A Full Tower

- 6 x External 5.25" Bays
- 2 x External 3.5" Bays
- 5 x Internal 3.5" Bays
- High quality 1mm thick steel
- Power Supply: 300W ATX
- Front USB & Audio
- Smart slide-in back bracket with no screws needed
- W: 200mm
- D: 475mm
- H: 425mm



\$205

HX95 Desktop

- 3 x External 5.25" Bays
- 2 x External 3.5" Bays
- 1 x Internal 3.5" Bays
- Slide-out 3.5" device bays and smart slide-in back brackets
- Power Supply: 250W ATX
- W: 430mm
- D: 420mm
- H: 155mm



\$115

AOpen Power Supplies

- 250W P4 ATX POWER SUPPLY **\$69**
- 300W P4 ATX POWER SUPPLY **\$99**
- 350W P4 ATX POWER SUPPLY **\$125**
- 400W P6 ATX POWER SUPPLY **\$155**



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Optical Drives

52x CD-ROM

- Transfer rate up to 7,800KB/sec
- E-IDE Interface
- Mounts Vertically & Horizontally



\$49 MMLG002

16x DVD-ROM

- 16x DVD-Rom/4x CD-Rom Drive
- E-IDE Interface
- Mounts Vertically & Horizontally



\$79 MMLG004

48x16x48 CD-RW

- Writes CD-R at 48x/CD-RW at 16x
- Reads at up to 48x
- E-IDE Interface
- Mounts Vertically & Horizontally



\$125 MMLG009 *Picture for illustration purpose only

16x DVD + 32x10x40 CD-RW Combo

- Writes CD-R at 32x/CD-RW at 10x
- Reads CD at 40x/DVD at 16x
- E-IDE Interface
- Mounts Vertically & Horizontally



\$195 MMLG007 *Picture for illustration purpose only



Monitors



17" Studioworks SW700S

- 16" Viewable
- 0.27mm Dot Pitch
- Anti-Static & Anti-Glare & Anti-Reflection Surface Treatment
- Up to 1280 x 1024 @ 60Hz
- 395(H) x 408(W) x 420(D)mm
- Weighs 14.4kg

\$255 MMLG005



19" Studioworks SW900B

- 18" Viewable
- 0.26mm Dot Pitch
- AAS Coating
- Up to 1600 x 1200 @ 75Hz
- 454(H) x 446(W) x 470(D)mm
- Weighs 20.3kg

\$439 MMLG004



17" Flatron F700P

- 16" Viewable
- 0.24mm Dot Pitch
- AAS Coating
- Up to 1600 x 1200 @ 75Hz
- 435(H) x 415(W) x 439(D)mm
- Weighs 17kg

\$435 MMLG007

17" Flatron F700B Up to 1280 x 1024 @ 60Hz **\$315** MMLG005



15" LCD LI510S

- 15" TFT-LCD Super Slim Bezel
- Up to 1024 x 768 @ 75Hz
- Contrast Ratio 300:1
- 359(H) x 356(W) x 152(D)mm
- Weighs 4kg

\$675 MMLG006



17" LCD 782LE

- 17" TFT-LCD
- Up to 1280 x 1024 @ 75Hz
- Contrast Ratio 400:1
- 427(H) x 399(W) x 235(D)mm
- Weighs 7.5kg

\$CALL MMLG008



18.1" LCD LI810B

- 18.1" TFT-LCD
- Up to 1280 x 1024 @ 75Hz
- Contrast Ratio 350:1
- 431(H) x 406(W) x 222(D)mm
- Weighs 7.8kg

\$1845 MMLG009

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 or come in at 127 York St Sydney NSW 2000

acer

Monitors



15" LCD AL512

- 15" TFT-LCD
- 0.297mm Dot Pitch
- 16.7M Colours
- Contrast Ratio 350:1
- Up to 1024 x 768 @ 75Hz
- 351(H) x 356(W) x 182(D)mm
- Weights 4.1kg
- Built-in Speakers

\$675 MOAC044



17" LCD AL722

- 17" TFT-LCD
- 0.264mm Dot Pitch
- 16.7M Colours
- Contrast Ratio 400:1
- Up to 1280 x 1024
- 436(H) x 424(W) x 178(D)mm
- Weights 6.5kg
- Built-in Speakers

\$955 MOAC045

17" LCD AL707

- 17" TFT-LCD
- 0.264mm Dot Pitch
- 16.7M Colours
- Contrast Ratio 500:1
- Up to 1280 x 1024
- 449(H) x 432(W) x 215(D)mm
- Weights 5kg



\$875 MOAC016

19" LCD AL922

- 19" TFT-LCD
- 0.294mm Dot Pitch
- 16.7M Colours
- Contrast Ratio 500:1
- Up to 1280 x 1024 @ 75Hz
- 447(H) x 433(W) x 235(D)mm
- Weight 6.5kg
- Built-in speakers



\$1999 MOAC018

17" CRT AC711

- 16.1" Viewable
- 0.27mm Dot Pitch
- Up to 1280 x 1024 @ 60Hz
- 427(H) x 365(W) x 419(D)mm
- Weight 14.8kg



\$275 MOAC007



FUJIFILM Digital Cameras

Slimshot

- Auxiliary™ Technology ensures perfect pictures, every time - regardless of shooting conditions
- VGA: 640 x 480
 - MPEG: 320 x 240
 - 8MB Internal Memory
 - Shooting Distance: 60cm+
 - Fixed Focusing
 - USB Interface, Recharged via
 - Size: 85.6 x 54 x 6mm
 - Weight: 35g
 - Softcase Included



\$189 13FJ030

FinePix A202

- Up to 1600 x 1200 pixels
- 2.0 million effective pixels
- 2.5X Optical Zoom
- Power Save mode, Self-timer
- Up to 80 sec movie capturing
- xD-Picture Card media
- 1.5" LCD Monitor
- Webcam function
- USB Interface
- Power Source: 2xAAA batteries
- Size: 98.5 x 64.5 x 40.5mm
- Weight: 132g (excluding batteries & media)



\$345 10FJ031

FinePix A303

- Up to 2048 x 1536 pixels
- 3.24 million effective pixels
- 3X Optical Zoom
- 3.2X Digital Zoom
- Power Save mode, Self-timer
- Up to 240 sec movie capturing without sound
- xD-Picture Card media
- 1.5" LCD Monitor
- Webcam function
- USB Interface
- Power Source: 2xAAA batteries
- Size: 97 x 63.9 x 34.3mm
- Weight: 145g (excluding batteries & media)



\$679 10FJ032

FinePix 2800 Zoom

- Up to 1600 x 1200 pixels
- 2.0 million effective pixels
- 4X Optical Zoom
- 2.5X Digital Zoom
- Power Save mode, Self-timer
- Up to 60 sec movie capturing with sound
- SmartMedia™ Cards
- 1.8" LCD Monitor
- Webcam function
- USB Interface
- Power Source: 4xAAA batteries
- Size: 95 x 77 x 71mm
- Weight: 270g (excluding batteries)



\$669 10FJ033

FinePix A304

- Up to 2048 x 1536 pixels
- 3.24 million effective pixels
- 4X Optical Zoom
- 3.2X Digital Zoom
- Self-timer
- Up to 200 sec movie capturing with sound
- xD-Picture Card media
- 1.8" LCD Monitor
- Webcam function
- USB Interface
- Power Source: 4xAAA batteries
- Size: 99.7 x 77.3 x 49.3mm
- Weight: 295g (excluding batteries & media)



\$875 10FJ034

FinePix F601 Zoom

- Up to 2832 x 2128 pixels
- 3.1 million effective pixels
- 3X Optical Zoom
- 4.4X Digital Zoom
- Self-timer
- Movie capturing 640 x 480 with sound @ 15 frames per second
- SmartMedia™ Card
- 1.5" LCD Monitor
- Webcam function
- USB video/audio input with cradle
- Power Source: NP 60 battery
- Size: 72 x 95 x 34mm
- Weight: 220g (excluding batteries)



\$1175 10FJ035

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Hard Drives

Maxtor

DiamondMax

Ultra ATA/100 120GB **\$315** H0MA025
5400 RPM
160GB **\$525** H0MA024

DiamondMax

Ultra ATA/133 40GB **\$169** H0MA010
7200 RPM
60GB **\$209** H0MA011
80GB **\$229** H0MA012



Western Digital

Mainstream Drives 5400RPM

Ultra ATA/100 40GB **\$155** H0WES060
9ms Avg. Seek time
5400RPM 60GB **\$179** H0WES081
80GB **\$205** H0WES062
120GB **\$325** H0WES083

Performance Drives 7200RPM

Ultra ATA/100 40GB **\$169** H0WES015
8.9ms Avg. Seek time
7200RPM 60GB **\$199** H0WES017
80GB **\$229** H0WES019
120GB **\$359** H0WES023
200GB **\$799** H0WES027

Seagate

BarraCuda

Ultra ATA/100 40GB **\$185** H0SG0257
8.9ms Seek Time
7200 RPM 60GB **\$195** H0SG0367
80GB **\$219** H0SG0368

Cheetah

Ultra160 SCSI 18GB **\$395** H0SG0760
5.1ms Seek
10000 RPM 36GB **\$599** H0SG0761
73GB **\$1195** H0SG0762

Notebook Hard Drives

9mm 2.5" Hard Drive 10GB **\$175** H0MT005
ATA-100 IDE Interface
4200 RPM 20GB **\$205** H0MT008
Compatible with most Notebooks 30GB **\$275** H0MT010
40GB **\$345** H0MT011



Storage & Interface

3.5" External Hard Drive

Integrated power supply
Includes Power Cable
Includes FireWire/USB 2
Cable
Compatible with Windows
98/ME/2000/XP
Compatible with Mac OS
8.6/9.x/10.x
(W)162 x (L)1208 x
(H)36 mm
Weights 1.54kg Including Cables



**PC & Mac
Compatible**

FireWire USB 2*
24MB/s 15.9MB/s

Case w/HDD **\$145** H0A0E019 **\$139** H0A0E016
40GB **\$299** H0A0E000 **\$299** H0A0E006
60GB **\$335** H0A0E001 **\$335** H0A0E007
80GB **\$355** H0A0E002 **\$355** H0A0E008
120GB **\$455** H0A0E009 **\$455** H0A0E011
160GB **\$679** H0A0E010 **\$679** H0A0E012

2.5" Pocket Hard Drive

USB 2*

Case w/HDD **\$95** H0A0E016
10GB **\$249** H0A0E013
20GB **\$305** H0A0E014
30GB **\$385** H0A0E015
40GB **\$445** H0A0E016

**PC & Mac
Compatible**



• Weights 70g
• (W)75 x (L)130 x
(H)13 mm
• USB 2 Cables Included
• Compatible with Windows
98/ME/2000/XP
• Compatible with Mac OS

*USB 2 Hard Drives are backwards compatible with USB 1.1 ports; however, transfer rates will be limited to USB 1.1 specifications

*USB 2 Hard Drives are backwards compatible with USB 1.1 ports; however, transfer rates will be limited to USB 1.1 specifications

PCI to Firewire

Capture your digital video or attach your high speed storage devices quickly & easily with the PCI to FireWire Adapter.



\$55 C00E039

PCI to USB2

Connect all your USB 2.0 devices to this easy to install adapter. 100% backward compatible with all USB devices.



\$39 C00E040

PCI to USB \$29

C00E040H

PCI to USB2/Firewire

Connect all of your USB, USB 2 & FireWire peripherals to a single card.



\$119 C00E041

PCMCIA Firewire

Capture your digital video or attach your high speed storage devices quickly & easily with our PCMCIA adapters.



USB 2.0 **\$88** C00E049

FireWire **\$99** C00E040

USB 2 Card Reader

• USB 2.0 AND 1.1 compatible
• Reads IBM MicroDrive & Compact Flash Cards
• Driverless Support Under Windows 2000/ME/XP
• PC & Mac Compatible
• Compact Design With No Cables Required

\$49 H0MG052



7 in 1 USB Multicard Reader **\$55** H0MG018

Ext USB Floppy

• Compact & portable design
• Plug & Play, Hot swappable
• No external power required
(Bus powered mode)
• USB interface
• Supports both PC & MAC



\$99 F00E000

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LINKSYS

Broadband

www.linksys.com.sg

EtherFast® Cable/DSL Router

The perfect option to connect multiple PCs to a high-speed Broadband Internet connection or to an Ethernet back-hub.

- Connects up to 253 users to a broadband modem or to an Ethernet backbone
- Built-in NAT technology acts as a firewall protecting your internal network
- Configurable as a DHCP server for your existing network



\$159
(BEFSR1) NWLN000

EtherFast® Cable/DSL Router with 4-Port Switch

The combination of router and switch technology eliminates the need to buy an additional hub or switch and serves your network as a completely dedicated, full duplex backbone.

- Connects up to 253 users to a broadband modem or to an Ethernet backbone
- Built-in NAT technology acts as a firewall protecting your internal network
- Configurable as a DHCP server for your existing network
- Equipped with a 4-port 10/100 switch



\$259 (BEFSR4) NWLN010 **\$279** (BEFSR4TW) NWLN021

EtherFast® Cable/DSL Router with 8-Port Switch

- Provides port security, packet filtering, and filters internal user's access
- QoS capabilities to reduce the chance of data loss and allow for port-based prioritization
- Connects up to 253 users to a broadband modem or to an Ethernet backbone
- Built-in NAT technology acts as a firewall protecting your internal network
- Configurable as a DHCP server or client for your existing network
- Built-in 8-port 10/100 switch



\$299 (BEFSR8) NWLN022

Broadband™ EtherFast® Cable/DSL Firewall Router with 4-Port Switch/VPN EndPoint

Create up to two IPsec VPN tunnels, so you can securely connect to the corporate server from your home office - or any location when you're on the road.

- NAT and Stateful Packet Inspection firewall to protect your PCs from outside intruders on the Internet
- Supports URL filtering and time filtering
- Configurable as a DHCP server on your network
- Virtual Private Network (VPN) capabilities for secure access of remote networks



\$375 (BEFSR4I) NWLN005

EtherFast® Cable/DSL VPN Router with 4-Port 10/100 Switch

The ideal solution for remotely accessing a network securely over the Internet using cutting edge encryption and authentication methods.

- Provides full IPsec VPN capability
- Built-in NAT firewall provides exceptional network security for your network
- End-Point-to-End-Point IPsec VPN solution
- Supports up to 70 simultaneous IPsec VPN tunnels while allowing additional savings with no upgrade fees
- Acts as a DHCP server
- Built-in 4-port 10/100 switch for sharing broadband connection for up to 253 users



\$239 (BEFVR4I) NWLN066

Wireless Access Point Router with 4-Port Switch

The ideal solution for connecting your wireless network to a high-speed broadband Internet connection and a 10/100 Fast Ethernet backbone.

- Compatible with 802.11b, 2.4GHz compliant equipment
- Connection speeds up to 11Mbps
- Capable of up to 128-bit WEP encryption
- Supports DHCP and PPPoE pass-through
- Configurable as a DHCP server or your network
- Advanced security management, functions for port filtering, MAC address, filtering, and DMZ hosting
- Range up to 90m indoors and 345m outdoors



\$429 (BEFW11S4) NWLN007

LINKSYS

Wireless

Wireless PCI Card

Put your computer almost anywhere in the building, without the cost and hassle of running cables.

- 802.11b compliant
- Data rates up to 11Mbps
- Supports up to 128-bit WEP encryption
- 32-bit PCI local bus



\$245 (WMP11) NWLN008

Wireless USB Network Adapter

Connects directly to an USB-ready PC or notebook.

- 802.11b compliant
- Data rates up to 11Mbps
- Plug-and-play
- Supports up to 128-bit WEP encryption
- Range up to 91m indoors and 457m outdoors



\$239 (WUSB11) NWLN009

Wireless Network Adapter

One Type II or III PCMCIA slot is all you need to put the "mobile" back into mobile computing.

- 802.11b compliant
- Data rates up to 11Mbps
- Utilizes Direct Sequence Spread Spectrum (DSSS) to prevent down time
- Range up to 90m indoors and 450m outdoors



\$165 (WPC11) NWLN004

CompactFlash Card

Installs directly into your Pocket PC using a CompactFlash Type I or II slot.

- 802.11b compliant
- Data transfer rates up to 11Mbps
- Compatible with Windows CE 3.0 or higher
- Supports up to 128-bit WEP encryption



\$295 (WCF12) NWLN011

Wireless Ethernet Bridge

Connect any Ethernet-equipped device to a wireless network.

- Compatible with 802.11b compliant equipment
- Data transfer rates up to 11Mbps
- Provides wireless, cable-free bridging between remote workgroups
- Works without drivers or anything with an Ethernet port
- Range up to 80m indoors and 300m outdoors



\$295 (WET11) NWLN012

Wireless Network Access Point

- Compatible with 802.11b, 2.4GHz compliant equipment
- Data transfer rates up to 11Mbps
- Provides wireless access point roaming and bridging
- Wireless security of up to 128-bit WEP encryption
- Range up to 90m indoors and 457m outdoors



\$295 (WAP11) NWLN013

EtherFast® Wireless-Ready USB PrintServer

Compatible with virtually all USB, network-ready printers.

- Compatible with 802.11b compliant equipment
- Data rates up to 11Mbps (when used with the Instant Wireless Network PC card)
- 256KB memory buffer/512KB flash memory
- Stand-alone unit - no dedicated PrintServer PC required
- Integrates through both Ethernet and wireless connections



CALL (PPS10W) NWLN014

Wireless Print Server

Share a printer with everyone on your network.

- Compatible with 802.11b compliant equipment
- Data rates up to 11Mbps
- 256KB memory buffer/512KB flash memory
- Standalone unit - no dedicated print server PC needed
- Integrates through both Ethernet and wireless connections
- Range up to 91m indoors and 457m outdoors



\$339 (WPS11) NWLN015

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Ethernet

www.linksys.com.sg

EtherFast® II 10/100 Switch

and 24-port 10/100 full duplex, auto-sensing ports.
 10/100 auto-sensing ports run 10BaseT & 100BaseTX hardware together seamlessly
 Non-blazing speeds of 200Mbps in full duplex mode
 Data flow control filters out packet errors
 Internal bandwidth of 2.7Gbps
 Optional 100BaseFX fiber module sends data to 2000m away in full duplex mode

6-Port (EP2516) **\$495** NWLN017
 4-Port (EP2516) **\$675** NWLN018

Gigabit Network Adapter

Use to run the fastest video, publishing, and database network applications.

10BaseT/100BaseTX/1000BaseTX
 Full duplex capability at speeds up to 2000Mbps

Wake-on-LAN & PnP compatible
 VLAN support

IEEE 802.3x flow control support
 IEEE 802.1p priority queuing support

Standard networking cable - no fiber cabling necessary

33MHz 32-bit PCI Local Bus (EG16832) **\$175** NWLN024

66MHz 64-bit PCI Local Bus (EG16844) **\$219** NWLN025

EtherFast® Switched 2-Port PrintServer

Non-blazing speeds of up to 200Mbps in full duplex mode
 2 printer ports share all your network bidirectional and parallel printers
 4 10/100 switched ports integrate your 10BaseT & 100BaseTX hardware together seamlessly

256KB memory buffer
 512 flash memory
 Data collision control and polarity correction

Stand-alone PrintServer - no dedicated PrintServer PC required

(EPSP42) **\$355** NWLN031

EtherFast® + 56K Modem PC Card

Maximize 10/100 networking performance and the power of a 56K fax/modem in one integrated card.

Simultaneously connect to the Internet and a 10/100 network

Fully integrated PC Card - no dongle or cable coupler is lost or break

Hot swappable
 Unique design only takes up one PCMCIA card slot

Type II PCMCIA 56Kbps data modem with 10/100 LAN and 14.4Kbps fax (PCLM56) **\$275** NWLN030

EtherFast® 10/100 Workgroup Switch

Each port automatically detects and negotiates between 10Mbps and 100Mbps speeds.

- Non-blazing speeds of 200Mbps in full duplex mode
- NWAT technology detects cabling type, speed, and duplex mode
- Advance station-and-forward packet switching optimizes data transfers
- Signal regeneration ensures data transfer integrity

8-Port (EXCS8BW) **\$145** NWLN019

5-Port (EXCS5BW) **\$109** NWLN010 16-Port (EXCS16BW) **\$279** NWLN020

EtherFast® 10/100 LAN Card

A high performance network adapter built to run with the fastest network applications.

- 10BaseT/100BaseTX
- Auto-detecting 10/100 RJ-45 port that automatically adjust to full or half duplex
- Full duplex capability up to 200Mbps
- Wake-on-LAN & PnP compatible
- 32-bit PCI local bus

(LINE100TX) **\$35** NWLN003

Gigabit Fiber Module

Provides up to two Gbps full duplex speed when combined with the EtherFast II 10/100 Managed 24-port Gigaswitch.

Compatible with the IEEE 802.3z standard for 100Base-SX networking

Compact design mounts EtherFast II 10/100 Managed 24-port Gigaswitch with the Gigabit Fiber Module fits within rack mounts for high bandwidth applications

Built-in SNMP features which provide maximum network control, regulating traffic and eliminating server bottlenecks (EG24M1) **\$425** NWLN023

EtherFast® 10/100 Compact USB Network Adapter

Connect to any 10, 100, 10/100 Mbps hub or switch without having to open your PC

Connect to any Ethernet network from your computer's USB port

18K memory buffer
 Easy-to-Read LED indicators
 Plug-and-Play compatible

Powered by host PC
 Compact design - perfect for use with notebook PCs

(USB100M) **\$75** NWLN002

EtherFast® 10/100 PrintServer

The easiest and fastest way to add a printer to your network.

Stand-alone PrintServer - no dedicated PrintServer PC required

Bi-Directional, DMA-equipped parallel printer port(s) for maximum printer efficiency

512KB flash memory

Attach up to three printers directly to your network using standard Ethernet cabling

(PSPK1) **\$249** NWLN032

EtherFast® 10/100 32-Bit Integrated CardBus PC Card

Connect your notebook computer to a 10BaseT or 100BaseTX network in just minutes.

Automatically adjust to either 10Mbps or 100Mbps speeds

Fully integrated design - no more media couplers to lose

Single slot design is ideal for slim notebooks

Hot swappable
 32KB buffer (PCP200) **\$105** NWLN029

ProConnect Compact KVM Switch

Instantly toggle between four PS/2-equipped desktop or notebook PCs while using a single monitor, keyboard, and mouse.

Control multiple computers from a single keyboard, monitor, and mouse

Switch instantly between PCs

Serves as a quick docking station for notebook computers

(PCKVM4) **\$185** NWLN000

6-Foot PS/2 Cable Kit **\$29** NWLN001

Compact USB 4-Port Hub

Instant connectivity for up to four USB devices.

Data transfer rates up to 12Mbps

Ready to run with USB-equipped PCs or notebooks

One up to 4 USB 1.1 devices simultaneously

Bus-chain up to 127 USB devices at the same time

Hot swappable (USB4U4C) **\$69** NWLN002

LINKSYS®

Storage

USB Disk

The Linksys Instant USB Disk is a portable storage device that is perfect for you if you are always on the move or if you need to take your files with it. It's easy-to-use, fast, reliable, and affordable.

- USB 1.1 compliant
- Bus-powered
- Hot swappable and cable free
- Durable - shock resistant
- Retains data for at least 10 years



(USBM32M) **\$69** NWLN030

(USBM54M) **\$139** NWLN001

(USBM128M) **\$225** NWLN002

EtherFast® Network Attached Storage (80GB)

Affordable, easy-to-use 80GB Network Attached Storage and PrintServer.

Add 80GB of external hard disk space to your network

Built-in PrintServer allows addition of network printer

Internet Attached Storage (IAS) - remote users easily retrieve files using web browser

Built-in FTP server lets you conveniently transfer files using your favourite FTP Client

Automatically adjust to 10Mbps or 100Mbps Ethernet speeds

Acts as a stand-alone DHCP server for your network

Built-in disk utilities - self-test, scandisk, defrag

Expandable up to 240GB (EFG80) **CALL** NWLN031



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Printers/Scanners

HP Deskjet 3325

- 1200 x 600 dpi Print Resolution
- Up to 8 Black & White/6 Colour ppm
- Simplified printer control
- PC & Mac Compatible
- USB Interface



\$125 PRHPD120

HP Deskjet 3420

- 2400 x 1200 dpi Print Resolution
- Up to 10 Black & White/10 Colour ppm
- Banner & Poster Printing
- PC & Mac Compatible
- USB Interface



\$145 PRHPD112

HP Deskjet 3820

- 4800 x 1200 dpi Print Resolution
- Up to 12 Black & White/10 Colour ppm
- Manual two sided printing
- PC & Mac Compatible
- USB Interface



\$190 PRHPD113

HP Deskjet 5550

- 4800 x 1200 dpi Print Resolution
- Up to 17 Black & White/12 Colour ppm
- Automatically detects paper type and adjust print settings
- PC & Mac Compatible
- USB and Parallel Interface



\$279 PRHPD115

HP PSC 750

Super Value compact and complete printer, scanner and copier for HP Easy to scan and copy a wide variety of documents, even 30 objects with flatbed copier/scanner.

- 2400 x 1200 dpi Print Resolution
- Printing/Copying up to 11 Black & White/5 Colour ppm
- Flatbed 36-bit Colour Scanning
- PC & Mac Compatible
- USB Interface



\$369 PRHPD123

HP Officejet V40

A sheet fed, multi-function business tool that delivers photo-quality printing, faxing, scanning and copying - all in colour, right at your desktop.

- 2400 x 1200 dpi Print Resolution
- Printing/Copying up to 8 Black & White/7 Colour ppm
- 36-bit Colour Scanning
- 20 pages Automatic feeder
- Stand-alone & PC Fax



\$459 PRHPD108

HP LaserJet I220

Enjoy the comfort of laser printing, copying and colour scanning from one machine.

- Up to 1200 x 1200 dpi Print Resolution
- Prints up to 14ppm A4
- First page out in less than 10 seconds
- Copies up to 12ppm
- 9600 dpi enhanced scanner resolution
- USB 2.0 & Parallel interface



\$899 PRHPD122

HP LaserJet 1000

The personal desktop laser all-in-one that is ideal for the home office, small business.

- 1200 dpi Print Resolution
- Up to 10ppm Black & White
- First page in 15 seconds
- PC Compatible
- USB Interface



\$699 PRHPD117

HP LaserJet 2200

A reliable office laser printer, the HP LaserJet 2200 series is essential for business professionals who are looking for professional laser print quality with good productivity and versatility at an affordable price.

- 1200 dpi Print Resolution
- Up to 10ppm Black & White
- PC & Mac Compatible
- USB, Parallel, LocalTalk Interface
- Optional Network Interface



\$1469 PRHPD118

Epson Stylus C41UX

- 1440 x 720 dpi Print Resolution
- Up to 12 Black & White/12 Colour ppm
- PC & Mac Compatible
- USB Interface



\$115 PREP514

Epson Stylus C61

- 5760 x 720 dpi Print Resolution
- Up to 14 Black & White/4 Colour ppm
- PC & Mac Compatible
- USB & Parallel Interface



\$215 PREP509

Epson Stylus Photo 830

- 5760 x 720 dpi Print Resolution
- Up to 14 Black & White/1.1 Colour ppm
- Colourfast for up to 25 Years*
- Borderless Printing up to A4
- PC & Mac Compatible
- USB and Parallel Interface
- 6 Individual Ink Tanks



\$335 PREP505

Epson Stylus Photo 915

- 5760 x 720 dpi Print Resolution
- Up to 7.8 Black & White/3.2 Colour ppm
- Colourfast for up to 25 Years*
- Borderless Printing up to A4
- Paper Roll Holder
- Memory Card Printing
- Optional LCD Preview Monitor
- PC & Mac Compatible
- USB Interface
- 6 Individual Ink Tanks



\$445 PREP510

Epson Stylus Photo 1290

- 2880 x 720 dpi Print Resolution
- Up to 9.4 Black & White/3.3 Colour ppm
- Colourfast for up to 25 Years*
- Borderless Printing up to A3
- PC & Mac Compatible
- USB & Parallel Interface
- 6 Individual Ink Tanks



\$975 PREP504

Epson Stylus Photo 2100

- 2880 x 1440 dpi Print Resolution
- Up to 7.5 Black & White/3.3 Colour ppm
- Colourfast for up to 45 Years*
- Borderless Printing up to A3+
- Paper Roll + Auto Cutter
- CD-R & Thick Paper Printing
- PC & Mac Compatible
- USB 2.0, Parallel & Firewire Interface
- 7 Individual Ink Tanks



\$1745 PREP507

Epson i260

The combination of powerful features, ease-of-use, high-quality and affordability with the Perfection i260 Photo has taken home scanning to new levels. High speed document and photo scanning.

- Up to 1200 dpi (2400 dpi sub-scan)
- Optional Transparency Unit for 35mm film negatives/slides
- Single Superoperation and full auto mode
- Bundled with photo editing, OCR
- 48-bit colour
- PC & Mac Compatible
- USB Interface



\$249 IOPF511

Epson 2400

High speed and high resolution film scanning performance for the demanding user, the Perfection 2400 Photo delivers exceptional performance for every scanning need.

- High resolution - 2400 dpi (4800 dpi sub-scan)
- Integrated Transparency Unit for 35mm film negatives/slides
- Bundled with Adobe Photoshop Elements, OCR
- 48-bit colour
- On-board high-speed ASIC processor
- PC & Mac Compatible
- USB 2.0 Interface



\$475 IOPF512

Epson Stylus CX3100

The Photo Quality Multi Functional Printer that delivers easy to use stand-alone colour copying and scanning - perfect for the home and home office.

- Up to 5760 x 720 dpi Print Resolution
- Up to 7.5 Black & White/3.3 Colour ppm
- Flatbed 48-bit Colour Scanning
- Up to 600 x 1200 dpi Scan Resolution
- Approx. 10 Black & White/9 Colour Copies Per Minute
- PC & Mac Compatible
- USB Interface



\$345 IOPF505A

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Adelong Computers



Printers/Scanners

Canon S100SP

720 x 360 dpi Print Resolution
 Up to 5 Pages Per Minute
 Banner & Poster Printing
 PC & Mac Compatible
 USB Interface



\$105 PRCAN040

Canon 200SP

- 2880 x 1720 dpi Print Resolution
- Up to 5 Pages Per Minute
- Up to 3 Colour PPM
- PC & Mac Compatible
- USB Interface



\$145 PRCAN051

Canon S330

- 2400 x 1200 dpi Print Resolution
- Up to 14ppm black
- Up to 10ppm color & text
- PC & Mac compatible
- USB 2.0 interface



\$205 PRCAN057

Canon S520

Up to 14 Black & White/4 Colour Pages Per Minute
 Colourfast for up to 25 Years*
 2400 x 1200 dpi Print Resolution
 Full-Blind Printing Up To A4
 USB & Parallel Interfaces
 PC & Mac Compatible
 Individual Ink tanks



\$355 PRCAN053

Canon 750

- Up to 28 Black & White/13 Colour Pages Per Minute
- Colourfast for up to 25 Years*
- 2400 x 1200 dpi Print Resolution
- Full-Blind Printing Up To A4
- USB & Parallel Interfaces
- PC & Mac Compatible
- Individual Ink tanks



\$399 PRCAN052

Canon S830D

- Up to 4 Black & White/4 Colour Pages Per Minute
- Bubble Jet Direct Memory Card Printing
- Colourfast for up to 25 Years*
- 2400 x 1200 dpi Print Resolution
- Borderless Printing Up To A4
- USB & Parallel Interfaces
- PC & Mac Compatible
- Individual Ink tanks



\$795 PRCAN053

Canon D646Uex

This stylish and compact unit is easy to set up with a Mac or PC to produce outstanding 600 x 1200 dpi resolution images.
 • Powerful Imaging and OCR software • 600 x 1200 dpi
 • 48-bit input and 24-bit output
 • Connect to Mac or PC
 • Advanced 2-Lid
 • USB Interface



\$165 I0CAN027

CanoScan I250U2F

Designed for ease of use and quality scanning, the CanoScan I250U2F has three built-in scan buttons, for easy operation with tasks such as scan, copy and email.
 • 1200 x 2400 dpi Optical Resolution
 • 48-bit input and 24-bit output
 • Advanced 2-Lid for scanning of bulky items
 • Fax USB 2.0 Interface



\$299 I0CAN028

IO / Speakers

Logitech MX 300 Optical Mouse

Most advanced optical system at 800dpi provides unparalleled accuracy
 Quick Switch allows you to move between applications with 1-touch
 High resolution scroll wheel
 USB & PS/2 adapter



\$59 I0LOG049

Logitech Cordless Optical Mouse

- Cordless mouse requires no cables
- Power management keeps batteries working for months
- 3 Customisable buttons
- High resolution scroll wheel
- USB & PS/2 adapter
- Includes 2 x AA batteries



\$75 I0LOG041

Logitech Cordless Keyboard

- No more wires with standalone keyboard
- Access favorite websites & applications with 1-touch keys
- Control audio and video from keyboard
- MAC & PC Compatible
- USB & PS/2 adapter



\$99 I0LOG050

Logitech Z-340

2.1 Channel Audio
 20W Subwoofer / 6.5W per Satellite (Total 33W RMS)
 35Hz - 20KHz, SNR 85dB
 Satellites can be moved or placed on desk
 Headphone jack and volume control



\$109 I0MLOG04

Logitech Z-640 Dolby Digital

- 5.1 Channel Audio
- 25W Subwoofer / 9W per Satellite (Total 70W RMS)
- Experience Dolby Digital sound (DTS) from movies, music and games
- System controls embedded on center channel speaker



\$175 I0MLOG05

Logitech Z-560 THX Certified

- 4.1 Channel Audio with hi-fi wire clogs
- 8" 180W Subwoofer / 53W per Satellite (Total 400W RMS)
- Thunderous bass and superior dynamics for the ultimate audio experience
- Separate Control with multiple sound controls and headphone jack

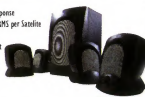


\$385 I0MLOG03

Altec Lansing AVS500

The compact AVS500 is a solid entry-level surround system that will instantly improve the way your PC sounds.

- 40Hz - 22KHz Frequency Response
- 4.1W RMS Subwoofer/2.2W RMS per Satellite
- 4.1 Channel Speakers
- 17W RMS Total Power Output
- Built-in controls



\$139 I0MAL013

Altec Lansing AVS 5100

Whether you're watching movies, playing games or listening to music on your PC, you demand big sound. Two- and three-speaker systems just don't cut it. The Altec Lansing 5100 was designed for audio fanatics like you.

- 5.1 Channel Speakers
- 22.5W RMS Subwoofer/7W RMS per Satellite
- 73W RMS Total Power Output
- 22Hz - 22KHz Frequency Response
- Full-Function Digital Controller
- Headphone Jack, Auxiliary Input Jack



\$395 I0MAL020

Altec Lansing 2100 (2speaker + Sub) **\$215** I0MAL017

Altec Lansing 641

Our Ultimate 5-piece system immerses you in breathtakingly powerful sound. A dual-powered subwoofer delivers deep, sustaining bass that brings your favorite games to life. If you're serious about gaming, this system will blow you away.

- 5.1 Channel Speakers
- Magnetic shielding
- Satellite mounted audio controls
- 29W RMS Total Power Output
- 70Hz - 18KHz Frequency Response



\$475 I0MAL010

Altec Lansing 621 (2speaker + Sub) **\$215**

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Miscellaneous

Microsoft Blue Optical

Turn any desktop into a bright, vibrant space with the Microsoft Optical Mouse Blue. It offers a fun design with a wider, one-of-a-kind, clear scroll wheel and a signature red optical glow.



\$55 HMCT055

Wireless Optical
\$89 HMCT056

Microsoft Multimedia Keyboard

Maximize your digital experience and have 1-button access to navigate music, the Internet, videos and programs you access frequently.



\$75 HMCT057

MS Internet Keyboard **\$49** HMCT058

SideWinder Precision 2

In a wild, hair-raising daylight, precision and control are critical. That's why the SideWinder® Precision 2 has been reengineered for even more accuracy. With its nimble rudder twist, and an improved throttle, this professional quality stick feels as great as it performs.



\$85 HMCT053

with MS Flight Simulator 2002 Std **\$129** HMCT054

SideWinder Precision Wheel

The SideWinder Precision Racing Wheel is a complete driving system including a compact yet rugged state-of-the-art PC steering wheel. The wheel includes an easy-to-release clamp for quick attaching and removing, sturdy non-slip pedals, and 8 buttons, including 2 shifters-triggers



\$109 HMCT055

I/O expansion Card



PCI Printer Card
\$39 CGEN002

Dual PCI Printer Card
\$45 CGEN037

PCI One High Speed Serial Port Card
\$49 CGEN036

PCI Two High Speed Serial Port Card
\$55 CGEN039

Tekram DC-315U Ultra SCSI Card



\$49 CGEN019

3.5" Floppy Drive



\$29 FOPAN000

CD Media/DVD Media

10 Pack 80Min CD-R **\$15** HMVER029

50 Pack 80Min CD-R **\$39** HMVER040

5 Pack 700Mb CD-RW **\$9** HMVER030



DVD-R **\$9** HMVER036

DVD-RW **\$12** HMVER037

DVR + R **\$10** HMVER038

DVD + RW **\$12** HMVER039



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money back guarantee will be subjected to a 15-30% re-stocking fee based on the condition of the product.
 Adelong will not accept any courier charges for return goods. Carriage for warranty repairs must be paid for by the customer. A returns authorization number (RA#) must be obtained before the return of any product. A returns number is valid for 14 days only. Failure to display the RA number will result in the return being refused.
 All computer warranties are supplied as coverage for hardware only. In the event that faults are found to be a result of software failure, a service fee will be charged.
 We reserve the right to stipulate that our warranty on PC's and Parts overrides all other warranties that might be issued by the manufacturers.

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What drives you?™

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There's one nearly empty. Do you throw them all away?

Many inkjet printers, even some quite expensive ones, combine several different ink colours into one cartridge. When one colour runs out, you have to throw away the whole lot. Most Canon models use inexpensive separate tanks for each colour. They also have an advanced ink monitoring system that alerts you

on-screen when any of the colours are getting low, so no more running out of ink halfway through a document. You'll find a new

Canon Bubble Jet saves you time, and probably enough money to buy a decent bottle of wine or two. For more information, visit www.canon.com.au or call 1800 021 167.

